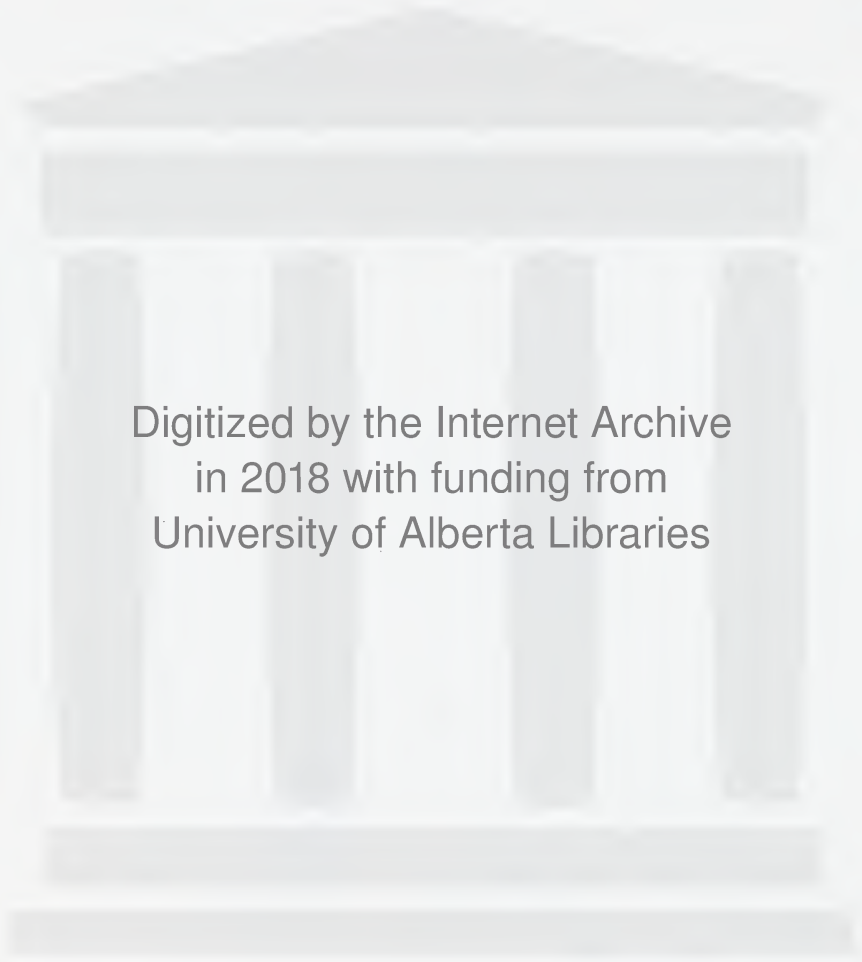

THE UNIVERSITY OF ALBERTA

A STUDY OF THE SELF-CONCEPTS AND IDEAL-CONCEPTS OF A GROUP OF ADOLESCENT STUDENTS

A DISSERTATION SUBMITTED
TO THE COMMITTEE ON GRADUATE STUDIES
IN PARTIAL FULFILMENT OF THE DEGREE OF
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SYNOPSIS

The primary aim of this investigation was to develop a forced-sort device for sampling the self-concept and the ideal-concept, and using this instrument, to study the relation between these variables for a group of adolescent students. Secondary aims included the investigation of sex differences in the self-ideal relationship during adolescence, and the study of the "concern" and "dissatisfaction" associated with various areas of the perceived self in adolescence.

A set of fifty-one self-descriptive statements was constructed to form a stratified sample which was representative of a strictly delimited theory of the self. A distribution chart was designed to make possible the continuous comparison of statements as they were sorted into eleven discrete "truth categories". The frequencies of statements in these categories were fitted to the best approximate normal distribution. A detailed procedure was devised for the administration of the forced-sort.

The forced-sort was administered twice to the same groups of adolescent students selected from Grades IX and X in two Edmonton schools. In the first sorting of the statements, the criterion was the truth of the statements relative to the individual's actual conception of himself; the criterion of the second sorting was the truth of the statements relative to the person he "would most like to be."

Although few mechanical difficulties were experienced in the group administration of the forced-sorts, absenteeism resulted in the loss of

some data, and lack of rapport was apparent in a few instances. Whether or not there is a more pronounced tendency in group administration, than in individual administration, for subjects to conceal their true attitudes toward themselves, is an open question.

Analysis of the data showed moderate, but highly significant, linear relationships to exist between the self-concepts and the ideal-concepts for the group as a whole, and for its constituent groups of boys and girls. Strong evidence was obtained for the existence of significant individual differences, or subpopulations, in the self-ideal, the self - group ideal, and the ideal - group ideal relationships, both for the group as a whole and for its constituent groups. These groups also exhibited a slight tendency for the self-concepts to conform to the appropriate group ideal, and a strong tendency for the ideal-concepts to correspond to the group ideal-concepts. Partial correlative analysis showed a general lowering of the self-ideal relationship when the influence of the group ideal was held constant. Further analysis showed significant positive direct variation between the self-ideal and self - group ideal relationships, and between the self-ideal and ideal - group ideal relationships, but not between the self - group ideal and ideal - group ideal relationships.

The concern exhibited by the group as a whole, and by the constituent groups, for the various areas of self-perception described in the theory, was fairly uniform. However, the limited coverage of these areas and the obscuring influence of the averaging process make

this apparent uniformity of doubtful significance.

Analysis of the intra-sex differences in "dissatisfaction with the areas of the perceived self" showed that the girls were significantly more dissatisfied with the area of "Mind" than with "Mental Processes" or "Bodily Processes."

Although no significant sex differences were found in the boys' and girls' mean self-ideal, self - group ideal and ideal - group ideal correlations, further analysis showed a significant tendency for a larger proportion of girls, than of boys, to have self concepts which conform more with their own ideal-concepts than with the group ideal for their sex. A significantly higher percentage of girls, than of boys, was found to have a high degree of conformity between their ideal-concepts and the corresponding group ideal for their sex.

Although no significant sex differences in "concern" for the various areas of self-perception were found, there did appear to be a slight tendency for girls, more than boys, to be concerned with the general "Mental" area of self-perception, and for boys, more than girls, to be concerned with the "Physical" aspects of the self.

There seemed to be a consistent,although not statistically significant, tendency for the girls, more than the boys, to be dissatisfied with all of the areas of self-perception.

Evidence was obtained which suggested a high degree of relatedness between the boys' and girls' group ideals.

CHAPTER I

ORIGIN AND PURPOSE OF THE INVESTIGATION

The current psychological literature shows a renewed concern with the self as a legitimate subject for psychological study. As is seldom possible, the stimulus for this reawakened interest can be located with some precision. In 1943, G.W. Allport, writing on The Ego in Contemporary Psychology, provided what may rightly be considered as a turning point in modern psychology.

> One of the oddest events in the history of modern psychology is the manner in which the ego (or self) became sidetracked and lost to view. I say it is odd, because the existence of one's self is the one fact of which every mortal person - every psychologist included - is perfectly convinced.[1]

Professor Allport provides an explanation for the loss of interest in the self as a subject for serious psychological investigation.

> The total eclipse of the soul and the partial eclipse of self were due in part, as I have just said, to the rise of positivism in psychology. Positivism, we all know, is a scientific program for moral re-armament, whose imperatives include absolute monism, absolute objectivity, and absolute reductionism - in short, absolute chastity. From this ascetic point of view, subjective certainties are suspect, selves seem a bit indecent, and any hint of metaphysics (that is, of non-positivistic metaphysics) savours of laxness.[2]

Professor Allport collected from the different conceptions of the ego to be found in the literature the following concepts, which he felt to be of primary importance.

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1. Gordon W. Allport. "The Ego in Contemporary Psychology". The Psychological Review, L, 1943, p. 451.
2. Ibid., p. 452.

The ego as knower.

The ego as object of knowledge.

The ego as primitive selfishness.

The ego as dominance-drive.

Ego as a passive organization of mental processes.

Ego as a 'fighter for ends'.

The ego as a behavioral system.

Ego as the subjective organization of culture.

He suggests that these eight concepts may ultimately be subordinated under one inclusive theory of the ego. From a survey of experimental evidence, Professor Allport concluded that -

> - the ego is acting in several, if not all, of the eight capacities I have listed. In other words, ego-involvement is, as the phrase implies, a condition of total participation of the self- as knower, as organizer, as observer, as status seeker, and as socialized being.[3]

One of the first important works to follow Allport's paper was the book, Self-Consistency, written by Prescott Lecky and published in 1945. After commenting that " - all of the individual's ideas are organized into a single system whose preservation is essential",[4] Lecky presents his fundamental thesis.

> The nucleus of the system, around which the rest of the system revolves, is the individual's idea or conception of himself. Any idea entering the system which is inconsistent with the individual's conception of himself cannot be assimilated, but instead gives rise to an inconsistency which must be removed as promptly as possible.[5]

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3. Ibid., p. 459.
4. Prescott Lecky. Self-Consistency, Island Press, New York, 1945, p. 135.
5. Ibid., p. 136.

The importance of the self in the field of educational psychology is clear when one considers the influence of the school upon the formation, and to some extent the fixation, of attitudes, interests, aspirations, values and ideals, all of which are implicit in the individual's self-concept or self-ideal. A.T. Jersild presents a strong argument for the study of the self by educators.

> There is a need of staggering magnitude for doing something in our educational program to help children and youth acquire realistic attitudes of self-acceptance. A large proportion of the young people now entering adulthood are burdened with anxiety, hostility, defensive attitudes toward themselves and others, feelings of guilt, inferiority, or other forms of self-disparagement and self-distrust.[6]

> We need to undertake a program of study to find to what extent and in what ways we might in the normal process of education achieve for all growing persons such benefits as those which the psychotherapist tries to bring about for his patients in the process of re-education.[7]

> The school is second only to the home as a place where the social forces which influence a child's attitudes toward himself and others are concentrated.[8]

Even in the allied field of guidance, there is a growing realization of the importance of the self. Commenting on vocational adjustment, Super feels that an individual's " - exploration of his own feelings and attitudes may bring about not only self-understanding, but a self-acceptance which releases the individual emotionally so that he is free to face facts and to deal with them more rationally."[9] The

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6. Arthur T. Jersild. In Search of Self, Bureau of Publications, Teachers College, Columbia University, New York, 1952, p. 5.
7. Ibid., pp. 5-6.
8. Ibid., p. 7.
9. Donald E. Super. "Vocational Adjustment: Implementing a Self-Concept", Occupations, XXX, 1951, p. 90.

same author says, "In choosing an occupation one is, in effect, choosing a means of implementing a self-concept." [10] In the field of personal guidance, Hobbs expresses a similar point of view.

> The self becomes an organizing influence: it provides direction for the life of the individual by selectively responding to the environment, admitting those stimuli that are tolerable to the self, and excluding or distorting those stimuli which are unacceptable to the self.[11]

This is highly reminiscent of Lecky's assertion.[12]

It is scarcely necessary to emphasize the importance of adolescent psychology in the general field of educational psychology. The effects of adolescent changes on the self are perhaps less widely appreciated. The adolescent period is one of great turbulence in the development of the self-concept and self-ideal. Percival W. Symonds, commenting on this point, says, "During later adolescence, the individual is struggling to work out a new concept of the self which leaves behind the dependence of childhood and attains the independence and self-direction of maturity." [13] Likewise, "New self-ideals which may persist throughout life are taken on during adolescence, for this is the period when ideals are adopted." [14] The significance of the discrepancy between the self-concept and self-ideal in adolescence has been discussed by Henry C. Lindgren.

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10. Ibid., p. 92.
11. Nicholas Hobbs. "Guidance and Some Recent Developments in Psychology", Canadian Journal of Psychology, III, 1949, 9. 71.
12. Supra, p. 2.
13. Percival W. Symonds. The Ego and the Self, Appleton-Century-Crofts, Inc., New York, 1951, p. 77.
14. Ibid., p. 77.

> As the child grows into adolescenthood and adulthood, he becomes more able to behave according to adult standards. As this occurs, the difference between his self-concept and his self-ideal usually diminishes and he becomes less anxious and at the same time attains a feeling of greater adequacy.
>
> The existence of a large gap between the self-concept and the self-ideal means that the individual does not like himself. He is likely to be self-critical and discouraged about his ability to do the right thing in the right way. We say that he does not accept himself. Immature persons are characterized by a low degree of self-acceptance.[15]

Although there is a considerable body of recent research on the self and subjects related to it, little study has been directed toward the self in adolescence. In particular, little is known about adolescent self-acceptance. The present investigation was undertaken to contribute to the closing of this gap by developing an instrument for sampling the self-concept and self-ideal, and, using this, to examine the relation between the self-concepts and self-ideals of a group of adolescents. Secondary aims of the investigation were to study sex differences in adolescent self-acceptance, to study the relation of the self-acceptances of individual adolescents to the ideal-concept of the group of which they are members, and to study the concern and dissatisfaction, shown by adolescents, for the various areas of self-perception.

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15. Henry Clay Lindgren. Mental Health in Education, Henry Holt and Company, New York, 1954, p. 98.

CHAPTER II

THE SELF IN PHILOSOPHY AND PSYCHOLOGY

The literatures of philosophy and psychology contain a wide variety of approaches to a definition of the self. It is beyond the scope of the present discussion to attempt to review them all. An attempt will be made, however, to include some of the more important philosophical conceptions of the self, to discuss the more relevant psychological conceptions, and to present a theoretical foundation for the study of the self-concept and self-ideal in the present investigation.

I. SOME PHILOSOPHICAL CONCEPTIONS OF THE SELF

Kant and Schopenhauer discussed the philosophical distinction between the subjective 'I' and objective 'Me'. The 'I' was considered as 'the knower', the 'Me' as 'the object of knowledge'. This dual concept of the self has been the subject of voluminous philosophical discussion.

J. S. Moore, describing the transcendentalist conception of the self, says, "It is true that 'I' (the subject) can only know 'Me' (the object), but it is only one self that knows (as subject) and is known (as object)."[1] Thus he rejects a dual theory of the self in the form of a knowable object-self and unknowable subject-self. Further-

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1. Jared S. Moore. "The Problem of the Self". The Philosophical Review, XLII, 1933, p. 490.

more, he ascribes to the self a spiritual core which he feels has been ignored by contemporary psychologists. He says, "The self as the psychologist studies it (my 'mind') is but an integration of feelings, desires, and ideas; but surely this is not all that 'I' am - rather am I a system of values, a centre of purposes, a pursuer of ideals."[2] In the same vein, he says, "My soul is not another self from my mind; it is 'myself' in the most intimate sense of that word."[3] However Moore does see fit to distinguish between mind and spirit: "Mind is the integration of phenomenal consciousness, and spirit is the integration of spiritual consciousness -." [4] He feels that " - the phenomena of the body in their interrelations are amenable to causal explanation, and so with mental phenomena in their interrelations -", but that, as for the spirit, " - there is always a residue not so amenable."[5]

Dampier points to the difference between the philosophical and psychological concepts of the self, but he stresses that the reality of the self is essentially independent of these concepts. He says,

> Is the self an entity existing before and independently of experience, as in the older philosophies, or is it a composite, secondary structure, put together by the very action of sensations, perceptions and other mental activities, as some modern psychologists hold? The question cannot be answered by general agreement, but perhaps it need not be answered. However formed, the self is conscious, and in Eddington's sense is self-knowing and therefore real.[6]

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2. Ibid., p. 490.
3. Ibid., p. 491.
4. Ibid., p. 493.
5. Ibid., p. 494.
6. Sir William Cecil Dampier. A History of Science. The University Press, Cambridge, 1949, p. 486.

Whitehead predicates self-knowledge on a knowledge of a plurality of things other than the self.

> Thus the self-knowledge inherent in the bodily event is the knowledge of itself as a complex unity, whose ingredients involve all reality beyond itself, restricted under the limitation of its pattern of aspects. Thus we know ourselves as a function of unification of a plurality of things which are other than ourselves.[7]

> The conclusion follows that our consciousness of the self-identity pervading our life-thread of occasions is nothing other than knowledge of a special strand of unity within the general unity of nature. It is a locus within the whole, marked out by its own peculiarities, but otherwise exhibiting the general principle which guides the constitution of the whole.[8]

II. THE SELF IN PSYCHOLOGY

In contradistinction to Moore, William James propounded a distinctly dualistic theory of the self. "I shall therefore treat successively of A) the self as known, or the me, the 'empirical ego' as it is sometimes called; and of B) the self as knower, or the 'I', the 'pure ego' of certain authors."[9] In respect to the former, James provides a definition which is perhaps too inclusive.

> In its widest possible sense, however, a man's Me is the sum total of all that he CAN call his, not only his body and his psychic powers, but his clothes and his house, his wife and children, his ancestors and friends, his reputation and works, his lands and horses, and yacht and bank-account.[10]

James felt that the 'empirical ego' consists of three classes -

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7. Alfred North Whitehead. Science and the Modern World, Mentor Books, The New American Library, New York, 1948, p. 151.
8. Alfred North Whitehead. Adventures of Ideas, Penguin Books, Harmondsworth, Middlesex, 1948, p. 219.
9. William James. Psychology, The World Publishing Company, Cleveland and New York, 1948, p. 176.
10. Ibid., p. 177

"The material me;
The social me; and
The spiritual me."[11]

In addition to these constituents of the 'Me', James felt that the history of the 'Me' includes the feelings and emotions which the constituents arouse, and the acts which they prompt. He summarized the 'empirical life of the Self' in the following table:

TABLE I. WILLIAM JAMES' 'EMPIRICAL LIFE OF THE SELF' SHOWING THE COMPOSITION OF THE CONSTITUENTS OF THE SELF[12]

	Material	Social	Spiritual
Self-Seeking	Bodily Appetites and Instincts. Love of Adornment, Foppery, Acquisitiveness, Constructiveness. Love of home, etc.	Desire to Please, be Noticed, Admired, etc. Sociability, Emulation, Envy, Love, Pursuit of Honor, Ambition, etc.	Intellectual, Moral and Religious Aspirations, Conscientiousness.
Self-Estimation	Personal Vanity, Modesty, etc. Pride of Wealth, Fear of Poverty.	Social and Family Pride, Vainglory, Snobbery, Humility, Shame, etc.	Sense of Moral or Mental Superiority, Purity, etc. Sense of Inferiority or of Guilt.

Lecky has located the ego (or self) diagrammatically as the core of the personality. He sees this core as remaining unaltered during the

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11. Ibid., p. 177.
12. Ibid., p. 195.

evolution of the personality from birth to adulthood insofar as its position in the personality is concerned.

Figure 1. Lecky's Organization and Evolution of the Personality[13]

Lecky has offered some valuable comments on the necessity for change in the self-concept, and on the difficulties involved in making such a change.

> Finally, it is sometimes necessary to alter the opinion one holds of oneself. This is difficult, for the individual's conception of himself is the central axiom of his whole life theory. Nevertheless, a gradual change in the concept of the self is imperative to normal development and happiness.[14]

Of particular importance to education is the resistance of the self-concept to change. Lecky gives a striking illustration of the effects of such resistance in the case of an intelligent student who is deficient in spelling.

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13. Lecky, op. cit., p. 90.
14. Ibid., p. 137.

> The resistance arises from the fact that at some time in the past the suggestion that he was a poor speller was accepted and incorporated into his definition of himself, and is now an integral part of his total personality. His difficulty is thus explained as a special instance of the general principle that a person can only be true to himself. If he defined himself as a poor speller, the misspelling of a certain proportion of the words which he uses becomes a moral issue. He misspells words for the same reason that he refuses to become a thief. That is, he must behave in a manner consistent with his idea of himself.[15]

> What a person is able or unable to learn, in other words, depends, to a large extent at least, upon what he has already learned, and especially on how he has learned to define himself.[16]

Allport has reviewed the sensationalistic and Gestalt conceptions of the self.

> The fusion of sensory impressions, particularly around the kinesthetic sense of postural strain and position, originates the sense of self. This theory is wholly congenial to empiricism, to the belief that at birth the infant is a tabula rasa upon which the sense of self along with everything else has yet to be engraved. William James found evidence for this sensationalistic theory in his observation that for the adult the reportable experience of selfhood is usually reduced to a matter of postural strains and stresses, centering especially in the head.[17]

> Following a less sensationalistic view, a more abstract location is suggested by Koffka. The self (or Ego) is that which lies between Right and left, between before and behind. The self is the point of reference in all temporal experience too, for it lies as well at the exact junction of past and future.[18]

James Benjamins has discussed the external influences on the formation of the individual's conception of himself.

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15. Ibid., p. 140.
16. Ibid., p. 144.
17. Gordon W. Allport. Personality, A Psychological Interpretation, Henry Holt and Company, New York, 1937, p. 163.
18. Ibid., p. 163.

> Normally once never perceives himself apart from a contrasting background or without boundaries, nor does he usually view the world as if he were wholly unrelated to it.[19]

> Among the many influences determining the nature of the picture the individual gains of himself, his perceptions of the reactions of others toward him are probably most potent.[20]

An empirical conception of the self has been presented by Theodore R. Sarbin.

> The human animal can regard itself as an object in the same way as it regards objects in the external world. Put in other terms, the inter-behavioral field of the human can include perceptions and cognitions referable to objects in the external world, and to perceptions and cognitions referable to his own body, to his beliefs, his own statuses, and so on.[21]

> The self is empirically-derived, not transcendental; it is the resultant of experience, that is, interaction with bodily parts, things, persons, images, and so on.[22]

Camilla M. Anderson has written on the composition of the self-concept, using an anatomical and physiological analogy.

> Every one has an image or a concept of himself as a unique person or self, different from every other self. This concept pertains to one's self both as a physical person and as a psychological person - i.e. each one has a physical and a psychological self-image.[23]

> The self-concept or image is composed of many parts, and each part is conceived of as having both structure and function or as having both anatomy and physiology. Every organ or member that

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19. James Benjamins. "Changes in Performance in Relation to Influences upon Self-Conceptualization", The Journal of Abnormal and Social Psychology, XLV, 1950, p. 474.
20. Ibid., p. 474.
21. Theodore R. Sarbin. "A Preface to a Psychological Analysis of the Self", The Psychological Review, LIX, 1952, p. 12.
22. Ibid., p. 12.
23. Camilla M. Anderson. "The Self-Image: A Theory of the Dynamics of Behavior", Mental Hygiene, XXXVI, 1952, pp.227-228.

is conceived of as doing a specific job is included in the individual's physical self-image. Organs are also given different values, depending on the conceived functional value of each one. The heart, for example, is ordinarily more highly valued than is the hand.[24]

It is likewise true that every character trait that carries with it the implication of a result to be obtained through its use is a part of the psychological self-image. Every portion of the psychological self-image thus also has both anatomy and physiology, structure and function. As in the physical area, so in the psychological, there is a hierarchy of traits, some having great value in the individual's conceptual thinking and others having less.[25]

Jersild has given a comprehensive summary of psychological conceptions of the self.

> The self is a composite of thoughts and feelings which constitute a person's awareness of his individual existence, his conception of who and what he is. A person's self is the "sum total of all that he can call his". The self includes, among other things, a system of ideas, attitudes, values and commitments. The self is a person's total subjective environment. It is a distinctive "center of experience and significance". The self constitutes a person's inner world as distinguished from the "outer world" consisting of all other people and things.
>
> The self is "the individual as known to the individual". It is "that to which we refer when we say 'I'." It is the "custodian of awareness"; it is the thing about a person which has awareness and alertness, "which notices what goes on, and... notices what goes on in its own field".
>
> The self is reflexive -- it is an object to itself and it can be both subject and object. It is both a knower and a thing that is known, a perceiver and a thing perceived. As a knower, the self is able to take a "panoramic view of the total personality".
>
> The self has also been described as the nucleus of personality.
>
> The self is both constant and changeable. It includes the "...constant nature of an individual plus all that is conditioned by time and space and that is changeable." It provides a "nucleus on which, and in which, and around which experiences are

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24. Ibid., p. 228.
25. Ibid., p. 228.

> integrated into the uniqueness of the individual." In the process of experience, the healthy self adds, assimilates, and integrates within its own system that which is essential and authentic, while renouncing what is "unessential, strange and harmful."[26]

Discussing the "Self and Society", Jersild stresses the implications in education of the social origin of the self.

> Each person's self is something individual, yet it has a social origin. This fact has important meanings for education because many of the strongest social influences are brought to bear upon the child by way of his experiences at school.[27]

III. THE SELF IN THE PRESENT INVESTIGATION

It will be clear from the preceding section that there is no universally accepted definition of the self or its constituents. Unfortunately, this lack of unanimity does not relieve the investigator of the responsibility of defining the self as it enters into his particular investigation. Certain questions pertaining to the self must be answered as a necessary preliminary to research. Some of these questions have been clearly posed by Robert B. MacLeod.

> We still lack the answers to some of the most elementary questions. What sets the boundaries of selfhood? What segregates it from the rest of the field? To what extent is it identical with the body-percept? Is it a single system?[28]

In the subsequent parts of this section, an attempt will be made to answer these and other questions as they apply to the present investigation.

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26. Jersild, op. cit., pp. 9-10.
27. Ibid., p. 11.
28. Robert B. MacLeod. "Perceptual Constancy and the Problem of Motivation", Canadian Journal of Psychology, III, 1949, p. 64.

Since Freud, psychologists at various times have identified or intimately related the ego and the self. That they need not be considered as identical psychological concepts, is stated by Isidor Chein.

> - the self is not identical with the ego. If it were, then the knowledge of the ego would be as immediate as the knowledge of the self.
>
> For, while each individual recognizes himself, he has no immediate knowledge of ego processes such as repression or self-actualization.[29]

Without denying the possibility, indeed the inevitability, of interaction between the ego and the self, the present discussion will treat them as essentially different psychological concepts. By the ego is meant the objective self as it would be described by a completely informed and unbiased observer. The self will refer to the "subjective self as it is perceived, conceived, valued and responded to by the individual himself."[30] This is essentially the phenomenal self defined by Snygg and Combs as including " - all those parts of the phenomenal field which the individual experiences as part or characteristic of himself."[31] In the sense used here, the phenomenal field is taken simply as " - the universe of naive experience in which the individual lives, the everyday situation of self and surroundings which each person takes to be reality."[32]

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29. Isidor Chein. "The Awareness of Self and the Structure of the Ego", The Psychological Review, XLI, 1944, p. 305.
30. Percival W. Symonds. The Ego and the Self, Appleton-Century-Crofts, Inc., New York, 1951, p. vi.
31. Donald Snygg and A. W. Combs. Individual Behavior, Harper and Brothers, New York, 1949, p. 58.
32. Ibid., p. 15.

Specifically, the subsequent discussion will concern itself with but two aspects of the self: the self-concept and the self-ideal.

It is necessary to distinguish between the self as conceived and the self as perceived. The individual perceives certain aspects of himself when he looks in a mirror or listens to a recording of his own voice. Such a statement as, "My hair is black", is descriptive of the self as perceived. A concept of the self, on the other hand, results from a mental reaction to a percept or set of percepts of the self. If the above statement is altered to, "My hair is becomingly black", it becomes descriptive of the self as conceived. It follows that a percept or set of percepts must exist before a concept can be formed.

The exact nature of the reactive process involved in concept formation is not clear, but it would seem to involve integration, interpretation and evaluation. Further, it is possible to qualitatively describe the 'direction' of a reaction as positive, negative or neutral. A positively directed reaction is one which results in a concept which reflects satisfaction, optimistic acceptance or feelings of adequacy. A negatively directed reaction is one which reflects dissatisfaction, worry or conflict. A neutrally directed (or undirected) reaction is one which operates on an isolated percept in such fashion as to leave it unchanged in concept formation. Such neutrally directed reactions give rise to simple descriptive concepts devoid of emotional charge.

In addition to direction of reaction, it is possible to classify reactions by type. Symonds says, "It is possible to have awareness of the self without accompanying feelings. On the other hand, it is

not possible to have feelings about the self without awareness."[33] For the purposes of subsequent discussion, a reaction will be described as an awareness when, in statements descriptive of the self-concept, an individual fails to mention explicitly his feelings or valuations. A reaction will be described as a feeling when feeling, but not valuation, is mentioned explicitly. Finally, a reaction will be described as a valuation when a value judgment about the self is made with respect to an explicitly stated datum. Such rigid delimitation may seem artificial, but it is essential if classification of self-descriptive statements is to be made possible.

A rational explanation for the existence of negative self-values is suggested by Symonds.

> One can well understand why one clings to a positive concept of self, but it becomes more difficult to understand why an individual should persist in thinking of himself as being inadequate, ineffective, inept or stupid. To hold such attitudes toward the self indicates a masochistic tendency. A person does not dare to think well of himself for fear that such a concept would be toppled and then he would be disgraced in his own sight.[34]

Leon Litwinski, on the other hand, cautions us about the tendency of some psychologists to overemphasize negative self-values.

> The point is whether in insisting on the self that feels guilty and is anxious, whether in studying the ways in which we deceive ourselves by denial of impulses, of traits, or of memories by disguise in assigning our own undesirable traits to other people, in order to maintain or to restore self-esteem, we do not lose

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33. Symonds, op. cit., p. 79.
34. Ibid., pp. 104-105.

> sight, far more than we should, of the self that is flattered, that glorifies itself openly and frankly, that is proud of its acquisitions or achievements and that consequently likes itself.[35]

Symonds suggests the subjects of perception which, when observed and reacted upon, become concepts of the self. "The <u>self</u>, on the other hand, refers to the body and mind and to bodily and mental processes as they are observed and reacted to by the individual."[36] In the present investigation, the subjects of perception suggested by Symonds have been used to delimit the concept of the self.

'Mind' will refer to intelligence or mental ability, memory, mental efficiency, 'common-sense', reason, sense of humour and artistic ability. This is essentially what Jersild has categorized as -

> XI. Intellectual status; intelligence; ability or lack of ability to think, reason, remember; good or poor imagination; etc; ability or lack of ability to think quickly or make a good comeback; curiosity, desire to find things out, learn and discover; search for truth, ability to see both sides[37]

'Mental processes' will include feelings, emotions, intuitions, sensations, attitudes, interests, desires, morality and temperament. In this area of the self, Jersild has included -

> $XIII_x$. Personality traits; temperament; disposition; character traits; emotional tendencies; inner resources[38]

The word 'body' will refer to the organism itself and to such 'bodily extensions' as clothes, artificial limbs, glasses and so forth, when such are identified by the individual as part of his material self.

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35. Leon Litwinski. "Toward the Reinstatement of the Concept of the Self", <u>British Journal of Psychology</u>, XLII, 1951, p. 247.
36. Symonds, <u>op. cit.</u>, p.4.
37. Jersild, <u>op. cit.</u>, p. 139.
38. <u>Ibid.</u>, p. 139.

It will include all that Jersild has categorized under -

I. Physical characteristics
   A. General appearance;...
   B. Size; weight
   ...
   C. Build; shape; figure
   D. Features of face and head
   ...
   E. Upper extremities:...
   F. Lower extremities:...
   G. Other parts of body
   H. Posture:...
   I. Gait:...

I_x. Voice and vocal mannerisms;...
   A. Vocal qualities
   B. Tempo, rate of talking;...

II. Clothing; grooming; and make-up
   ... [39]

'Bodily processes' will include all of the physiological processes, such as digestion and respiration, as well as motor skills and abilities and the functioning of the senses. Jersild's categorization includes -

III. Health and physical condition
   A. General health; robustness; vigor; soundness
   B. Specific physical defects or assets

III_x. Attitude toward or enjoyment of, or habits connected with, sensory and bodily pleasures and comforts: eating;...

VIII. Participation in, enjoyment or lack of enjoyment of, recreation, sports, games, and hobbies...

IX. Ability in play and sports:... [40]

In discussing the development of the self-concept in adolescence, Symonds says, "The body is particularly valued and becomes the core of later self-value because it is the source of pleasure and pain and be-

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39. Ibid., pp. 135-136.
40. Ibid., pp. 136-138.

cause it is the tool or vehicle for achieving satisfaction."[41] Jersild has made valuable comments on the psychological implications of the bodily self-image.

> Physical features noted by a person in describing himself probably often represent more than meets the eye. They may be symbolic of deeper meanings. The child who is pudgy may not merely see his pudginess as something which detracts from his physical appearance. To him his pudginess may be a symbol of guilt and feelings of unworthiness.[42]

It follows from the preceding discussion that any statement which is descriptive of the self-concept may, in theory, be classified as resulting from a positively, negatively, or neutrally directed awareness, feeling or valuation of the body, bodily processes, mind or mental processes of the individual.

The development of the self-concept necessarily follows that of the perceived self. On this point, Symonds says, "We perhaps should make a distinction between the self as perceived and the self as conceived. Certainly the self as perceived comes earlier."[43] Further, he says, "The 'I' concept develops only as maturity and the advent of language make conceptualization possible."[44] Allport says, "Still another drawback is the child's deficiency in language. His concepts, expressing the relationship between himself and his surroundings, are but dimly formed, for as yet he lacks the capacity for sharply sculpturing thought with words."[45] The dependence of self-concept forma-

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41. Symonds, op. cit., p. 67.
42. Jersild, op. cit., p. 66.
43. Symonds, op. cit., p. 72.
44. Ibid., p. 72.
45. Allport, op. cit., p. 161.

tion on perception is suggested by Snygg and Combs. "It is probable that throughout the lifetime of the individual change is constantly occurring in the phenomenal self as he perceives the reactions of others to himself." [46]

The adolescent period is of major importance in the development of the self-concept. Elaborating on the direction of change in the self-concept during adolescence, Symonds says, "At the beginning of adolescence, as threats to the older established self values begin to appear, in consequence of doubts concerning his ability to meet expectations of himself and others, there is an increased selfishness and he becomes more self-centered." [47] Lecky has commented on change of outlook during adolescence.

> With adolescence, however, a change of such crucial difficulty and importance occurs in the structure and organization that emotional crises similar to those of early childhood frequently reappear.
>
> During this period of instability and reorganization, when the adolescent is revising his earlier values and changing his whole outlook on life, the need for unity is most acute. This may be seen in the growth of religious interests, idealism, and the desire for membership in social groups. [48]

Any discussion of changing concepts of self during adolescence leads naturally to a consideration of the self-ideal, for, as suggested earlier [49], this is the period during which persistent ideals are usually adopted. The self-ideal or 'self to be realized' refers to

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46. Snygg and Combs, op. cit., p. 92.
47. Symonds, op. cit., p. 78.
48. Lecky, op. cit., p. 89.
49. Supra, p.4.

the self which an individual wishes to become. It grows out of the realization of the possibilities of development toward a goal. Symonds suggests that the self-ideal " - is patterned after strong adults whom the child admires and takes as his models, but basically the self-ideal is determined by the basic drives - to love and to be powerful."[50]

The self-ideal gives direction to the development of the self-concept. At the same time however, the existing self-concept is influential in the selection of the goals which are embodied in the self-ideal. This is suggested by Snygg and Combs when, in discussing individual differences in the significance of goals, they say, "Each perceives the same object as a different kind of goal in terms of its peculiar reference to himself and his needs at the moment."[51] Symonds maintains that, "Goals are selected because they satisfy the fundamental need to maintain or enhance the self."[52] Symonds also discusses the influence of the self on the level of aspiration.

> The level of aspiration is highly self-involved. This means that the level of aspiration is set high when there is some challenge to the self, and the more the self is involved, the higher the goal discrepancy with past performance. In addition, the level of aspiration tends to be more constant when the self is involved and is less subject to fluctuations from one task to another.[53]

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50. Symonds, op. cit., p. 148.
51. Snygg and Combs, op. cit., p. 65.
52. Symonds, op. cit., p. 97.
53. Ibid., p. 97.

CHAPTER III

RELATED STUDIES

The stimulus provided by Allport's paper has resulted in a variety of research studies related to the self. Unfortunately, these studies do not follow a distinct pattern, nor are they consistent in their use of terms. This defect has resulted, in part at least, from the lack of a generally accepted theory of the self. This means that each author must define his terms more or less as he sees them in relation to his particular study. Perhaps the word 'defect' is unjustified, since, at the present stage of knowledge of the self, a variety of approaches has definite merits. It is hoped that, in the not too distant future, studies of the self will clarify its nature to such an extent that a uniform theory will result.

I. THE SELF AND ADJUSTMENT

The magnitude of the difference between the self-concept and the self-ideal may well be indicative of the individual's personal adjustment.[1] Commenting on this point, Mowrer says, "There would probably be universal agreement among psychotherapists, regardless of training or theoretical persuasion, that prior to treatment a disturbed, puzzled, suffering person would show a discrepancy between himself as

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1. cf. Lindgren, supra, pp. 4-5.

he 'is' and as he 'would like to be'."[2] Referring to the opinion of de Groot, Symonds says, " - for mental health the self-ideal must not be too high and demanding, not too vague and shadowy, and yet high enough to give continuous support to self-respect."[3]

From a study which he conducted on the relationship between adjustment and the discrepancy between the perceived[4] and ideal self for a group of thirty male undergraduates in psychology at the University of Wisconsin, Chodorkoff reported that -

> - a significant curvilinear relationship existed between adjustment and degree of correspondence between the individual's perceived and ideal self. The curvilinear regression of adjustment scores on correspondence scores showed that as adequacy of adjustment decreased, correspondence between perceived and ideal self decreased too, until a point was reached where from then on adequacy of adjustment increased as correspondence scores descreased. However, the level of adequacy of adjustment did not rise to the level found for the subjects with high correspondence scores.[5]

In a second study of thirty male undergraduates in psychology at the University of Wisconsin, Chodorkoff found a highly significant biserial correlation of +.73 between adjustment scores derived from the analysis of a biographical inventory, Rorschach protocols, a word-association test, and T.A.T. protocols, and 'accuracy of self-description scores' based on the analysis of a self-descriptive forced-sort

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2. O. Hobart Mowrer. Psychotherapy Theory and Research, The Ronald Press Company, New York, 1953, p. 319.
3. Symonds, op. cit., p. 149.
4. "perceived self", as used by Chodorkoff, corresponds to "self-concept", as it is used in the present study.
5. Bernard Chodorkoff. "Adjustment and the Discrepancy between the Perceived and Ideal Self", Journal of Clinical Psychology, X, 1954, pp. 266-268.

by a group of clinicians who acted as judges. From this study he concluded that, "The greater the agreement between the individual's self-description and an objective description of him, the more adequate will be his personal adjustment."[6]

Brownfain conducted a study of stability of the self-concept for a group of sixty-two members of two men's cooperative houses at the University of Michigan. He defined stability of the self-concept in the following words: "In this study, stability of the self-concept is measured in terms of the discrepancy between two definitions of the self: the self as it is 'positively conceived' and the self as it is 'negatively conceived'."[7] He concluded from this study that - "All findings support the theoretical prediction that subjects with stable self-concepts are better adjusted than those with unstable self-concepts."[8]

Taylor and Combs, in a study of self-acceptance and adjustment, sought to test the hypothesis that - "the well-adjusted individual ought to be better able to accept more unflattering (and hence threatening) facts about himself than would be expected of the less well-adjusted individual."[9] The results of their study were based on data

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6. Bernard Chodorkoff. "Self-Perception, Perceptual Defence, and Adjustment", Journal of Abnormal and Social Psychology, XLIX, 1954, pp. 508-512.
7. John J. Brownfain. "Stability of the Self-Concept as a Dimension of Personality", Journal of Abnormal and Social Psychology, XLVII, 1952, p. 597.
8. Ibid., p. 606.
9. Charles Taylor and Arthur W. Combs. "Self-Acceptance and Adjustment", Journal of Consulting Psychology, XVI, 1952, p. 89.

obtained for 105 boys and 75 girls in the sixth grade in a group of consolidated rural schools in northeastern Pennsylvania. These children were classified as adjusted or maladjusted on the basis of scores obtained on the California Test of Personality. Self-acceptance of damaging statements was estimated by means of a check list of self-descriptive statements. The authors found that - "The better-adjusted group checked significantly more items than did the poorer-adjusted group."[10] They felt that the hypothesis quoted above had been amply supported, and they concluded that - "Apparently the relationship between ability to accept damaging statements about self and adjustment is a real one and can be experimentally demonstrated."[11]

II. THE SELF AND INTEGRATION

In a theoretical discussion of the self and personality integration, McQuitty relates adjustment or 'adequacy of personality' to the self-concept.

> - we suggest that the adequate personality is one in whom the self is well integrated, in the sense that his successive subjective descriptions of self are characteristic of similar categories of people, and as a result of this he can readily accept into his organized conscious concept of self all his interpretations of reality, including, of course, perceptions of himself.[12]

Segal used a forced-sort device to sample the self-concepts and self-ideals of a group of clinicians. The self-concepts and self-

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10. Ibid., p. 91.
11. Ibid., p. 90.
12. Louis L. McQuitty. "A Measure of Personality Integration in Relation to the Concept of the Self", Journal of Personality, XVIII, 1950, p. 472.

ideals for the best integrated group (correlation + .81 to + .98 between self-sort and ideal-sort) and the most poorly integrated group (correlation - .25 to + .59) were compared. The author concluded that - "The ideal self concepts of both the best and most poorly integrated clinicians are virtually similar; the crucial differences lie in their evaluations of themselves."[13]

III. THE SELF AND OTHERS

In his exhaustive study and analysis of essays submitted by 1800 school and college students, Jersild found that -

> Persons in high school and college appraised themselves in terms of social relationships somewhat more often than did the younger people, but at all grade levels many young people saw themselves as they thought they were seen by others or in terms of their own attitudes to others.[14]

> The significance of relationships with others provides a simple but profoundly important aid to self-examination. In its simplest terms it may be read as follows: If one would know what he thinks about himself and how he feels about himself, let his glance turn to others, for the kinds of thoughts and feelings he has with regard to others are likely in one way or another to reflect his attitudes toward himself.[15]

McIntyre conducted a study to test Rogers' hypothesis that " - an individual's acceptance of himself is positively and significantly correlated with his acceptance of others."[16] A sociometric device in

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13. Julius Segal. "The Differentiation of Well and Poorly Integrated Clinicians by the Q-Sort Method", Journal of Clinical Psychology, X, 1954, p. 325.
14. Jersild, op. cit., p. 45.
15. Ibid., p. 46.
16. Carl R. Rogers. Client-Centered Therapy, Houghton Mifflin, Boston, 1951, p.520.

the form of a questionnaire developed by Phillips was administered to 315 male dormitory students. The results of the study were based on data obtained from 244 of these students, all of whom were white, second semester students living on the same floor of the dormitory. The author found a significant correlation of + .46 between the acceptance-of-self and acceptance-of-others scales of Phillips' questionnaire. He concluded that his results supported Rogers' hypothesis.[17] Using the same questionnaire on four different groups of high school and college students, Phillips found significant positive correlations (+ .51 to + .74) between attitudes toward self and toward others.[18]

Berger devised a group instrument for the measurement of self-acceptance and the acceptance of others based on Sheerer's definition of the 'self-accepting person' and the 'person who is accepting of others'. Using this instrument on a wide variety of groups, including college students, prisoners, stutterers, counselees, and so forth, the author concluded that " - evidence for a positive correlation between acceptance of self and acceptance of others was definitely supported and strengthened by the results of this study."[19] Correlations from + .356 to +.695, all but one of which were significant, were found between the variables. In an analysis of ten counselling cases,

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17. Charles J. McIntyre. "Acceptance by Others and Its Relation to Acceptance of Self and Others", Journal of Abnormal and Social Psychology, XLVII, 1952, pp.624-625.
18. E. Lakin Phillips. "Attitudes toward Self and Others: A Brief Questionnaire Report", Journal of Consulting Psychology, XV, 1951, pp. 79-81.
19. Emanuel M. Berger. "The Relation between Expressed Acceptance of Self and Expressed Acceptance of Others", Journal of Abnormal and Social Psychology, XLVII, 1952, p.782.

Sheererconcluded that - "There is a definite and substantial correlation between attitudes of acceptance of and respect for self and attitudes of acceptance of and respect for others."[20]

Stock, on the basis of a study of ten randomly selected clinical cases, concluded from statements made during nondirective psychotherapy that -

> - a definite relationship exists between the way an individual feels about himself and the way he feels about other persons. An individual who holds negative feelings toward himself tends to hold negative feelings toward other people in general. As his feelings about himself change to objective or positive, feelings about others change in the same direction.[21]

In a comparative study of self and group evaluations, Webb sought an answer to the question, "How does an individual's rating of himself compare with the ratings of him by a group of his close associates?"[22] The results of this study were based on data obtained for 31 members of a Jewish fraternity at Washington University. Ratings were obtained on the traits 'Personal Charm', 'Intelligence', 'Security', 'Jewish Appearance', and 'Jewish Acceptance'. The correlations obtained between the average rating given an individual by the group and the rating of the individual on the five variables were: (a) Personal Charm, .434;

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20. Elizabeth T. Sheerer. "An Analysis of the Relationship between Acceptance of and Respect for Self and Acceptance of and Respect for Others in Ten Counselling Cases", Journal of Consulting Psychology, XIII, 1949, p. 175.
21. Dorothy Stock. "An Investigation into the Interrelations between the Self Concept and Feelings, Directed toward Other Persons and Groups", Journal of Consulting Psychology, XIII, 1949, p. 180.
22. Wilse B. Webb. "Self-Evaluation Compared with Group Evaluations", Journal of Consulting Psychology, XVI, 1952, p. 305.

(b) Security, .220; (c) Intelligence, .602; (d) Jewish Appearance, .321; (e) Jewish Acceptance, .419. The author did not comment on the statistical significance of these correlations. The data were further subjected to a test for bias to determine whether or not there was a consistent tendency to overrate or underrate the self in comparison with the group rating. The author concluded that -

> Low correlations were obtained between the mean group ratings with the individual ratings, indicating a considerable disparity between the individual's concept of himself and the group's concept of the individual on the variables mentioned. Personal over- and under-evaluation was, as a group, related to the acceptability of a particular trait - a consistent tendency for over-evaluation was obtained.[23]

IV. OTHER STUDIES OF THE SELF

The purpose of a study by Cohen was " - to investigate goal-level setting within a level-of-aspiration framework by studying two variables, which were presumed to relate to the implicit factors determining goal-level setting."[24] The variables mentioned were; feelings of adequacy, and self-acceptance. The findings of this study were derived from data on 50 patients selected from medical and surgical wards of Duke Hospital. Level-of-aspiration was estimated from a series of trials on the Rotter Aspiration Board. Feelings of adequacy and self-acceptance were measured by the Rorschach. From an analysis of these data,

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23. Ibid., p. 307.
24. Louis D. Cohen. "Level-of-Aspiration Behavior and Feelings of adequacy and Self-Acceptance", The Journal of Abnormal and Social Psychology, XLIX, 1954, p.85.

> It was found that goal-level setting was not related to feelings of adequacy as defined in this study. However, a curvilinear relationship was discovered to exist between goal-level setting and self-acceptance. The results indicated that both very high goal setting and very low goal setting were related to self-rejection, and that only those who could accept themselves were able to use low positive goal setting.[25]

In a study of the development of the ideal-self in childhood and adolescence, Havinghurst, Robinson and Dorr based their conclusions on the analysis of essays submitted by boys and girls on the topic "The Person I Would Like to Be Like". The authors reached a number of valuable conclusions and framed some stimulating hypotheses.

> One conclusion is that the responses fall mainly into four categories, those of parents, glamorous adults, attractive and visible young adults, and composite, imaginary characters. Parent-surrogates such as teachers and older adults are seldom named, and heroes are very seldom named.[26]

> A second conclusion is that an age sequence exists, moving outward from the family circle, becoming more abstract, and culminating in the composite, imaginary character.[27]

> The following hypothesis appears to account for the observed age trends. The child from the age of about 6 to 8 generally chooses a parent or some other family member. Most children then move on to a choice either of a glamorous person or an attractive, visible young adult. The age for choosing a glamorous person is about 8 to 16. The choice of an attractive, visible young adult may start at 8 or 10 and continue all through adolescence, or it may give way to a more abstract ego-ideal in the form of a composite, imaginary person. The final and mature stage of the ego-ideal is the composite of desirable characteristics, drawn from all the persons with whom the individual has identified himself during childhood and adolescence.[28]

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25. Ibid., pp.85-86.
26. Robert J. Havinghurst, Myra Z. Robinson, Mildred Dorr. "The Development of the Ideal Self in Childhood and adolescence", Journal of Educational Research, XL, 1946, p.248.
27. Ibid., p. 248, cf. Lecky, supra, p.10.
28. Ibid., p. 248.

> The third conclusion is that social environment affects the choice of the ideal self.[29]

> Nevertheless, we may be sure that an individual will not report an ideal which is repugnant to him, not will he report a set of ideals which he has not thought about at all.[30]

From preliminary research, Benjamins framed the hypothesis that " - reactions in terms of self-conceptualization can be related to measurable behavior -". High school students first ranked themselves in intelligence and four other characteristics and then took a group intelligence test. The next day they were given false reports of their ranks on that test. After re-ranking themselves, they took an alternate form of the intelligence test. The direction of change in test scores was predicted for each subject on the basis of the change in self-ranking and the pattern of questionnaire responses, with the use of 'reaction categories' developed from preliminary research. The author concluded that -

> The observed frequencies of the two kinds of test score changes made by the subjects predicted to make each kind of change would be expected to occur by chance fewer than one time in a hundred.[31]

From a study of insight into one's own values, Stanley concluded that - "In this investigation there is a slight tendency (r= .38) for students whose values are pronounced to have better 'self-insight' than those whose profiles are relatively flat."[32]

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29. Ibid., p. 248.
30. Ibid., p. 257.
31. James Benjamins. "Changes in Performance in Relation to Influences upon Self-Conceptualization", The Journal of Abnormal and Social Psychology, XLV, 1950, p. 479.
32. Julian C. Stanley. "Insight into One's Own Values", Journal of Educational Psychology, XLII, 1951, p. 407.

In two studies of 151 delinquent adolescents, Rogers, Kell and McNeil concluded that - "The ratings of the individual's understanding of himself and the reality situation was, in both studies, the best predictor of what his future adjustment would be."[33]

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33. Carl R. Rogers, Bill L. Kell, and Helen McNeil. "The Role of Self-Understanding in the Prediction of Behavior", Journal of Consulting Psychology, XII, 1948, p. 184.

CHAPTER IV

EXPERIMENTAL DESIGN

Q-technique, as evidenced by the current psychological literature, has become a well established method for the experimental study of the self. It is beyond the scope of the present discussion to attempt to justify the use of Q-technique, or to dwell upon its theoretical foundations in psychology or statistics. The interested reader is referred to Stephenson's definitive work.[1] However, an attempt will be made to illustrate its application to the present study.

Q-technique was used to estimate the degree of relatedness between the self-concept and the self-ideal for a group of adolescents. This was accomplished by having the subjects sort a set of 51 self-descriptive statements into eleven categories ranging from "Most True" to "Least True". The procedure was carried out twice. On the first occasion, the subject judged the truth of each statement relative to his actual concept of himself. In the second sort, the truth of each statement was judged relative to the subject's self ideal: "the person he would most like to be". The number of statements permissible in any given "truth category" was rigidly set to make the frequencies of statements approximate, as closely as possible, the normal frequency distribution: Thus the term "forced-sort". By numbering the "truth categories",

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1. William Stephenson. The Study of Behavior: Q-technique and Its Methodology, University of Chicago Press, Chicago, 1953.

it was possible to associate with each self-descriptive statement a pair of numbers corresponding to the positions of the statement in the self-sort and the ideal-sort. The resulting 51 pairs of numbers could therefore be considered as a sample from an approximately normal bivariate population. The application of correlative analysis to this sample permitted the calculation of a correlation coefficient expressing the degreee of linear relatedness between the subject's self-concept and self-ideal.

I. THE CONSTRUCTION OF STATEMENTS DESCRIPTIVE OF THE SELF-CONCEPT AND SELF-IDEAL

In Chapter II, it was seen that statements which are descriptive of the self-concept may be classified by direction of reaction, by type of reaction, and by subject of perception. It has become customary in the language of Q-technique to describe the classifications as "independencies" and their categories as "levels". Thus the independency "direction of reaction" has levels - positive, neutral and negative; the independency "type of reaction" has levels - awareness, feeling and valuation; and the independency "subject of perception" has levels - body, bodily processes, mind and mental processes.

From a practical point of view, it is virtually impossible to construct a set of neutrally directed statements, which are even potentially applicable to a group of individuals, if they are to be of more than trivial significance. For this reason, it was decided to omit the "neutral" level of the "direction" independency.

With this restriction, a factorial design for a sample of self-descriptive statements is given in Table II. The scheme followed is that suggested by Stephenson.[2]

TABLE II. FACTORIAL DESIGN FOR A SAMPLE OF STATEMENTS DESCRIPTIVE OF THE SELF-CONCEPT

Independencies	Levels	Number	Degrees of Freedom
Direction of Reaction	(a) positive (b) negative	2	1
Type of Reaction	(c) feeling (d) valuation (e) awareness	3	2
Subject of Perception	(f) mental process (g) mind (h) bodily process (i) body	4	3

This results in 2 x 3 x 4 = 24 possible combinations of the independencies taken one level at a time. The theoretically possible combinations are:

acf	ach	bcf	bch
adf	adh	bdf	bdh
aef	aeh	bef	beh
acg	aci	bcg	bci
adg	adi	bdg	bdi
aeg	aei	beg	bei

2. William Stephenson, "Some Observations on Q-technique", Psychological Bulletin, XLIX, 1952, pp.483-498.

This scheme permits each self-descriptive statement to be identified with a letter combination which locates the statement in the theory. For example, the statement, "I feel unhappy about my stupidity", is of the type bcf. The statement, "I am a better swimmer than most of my friends", is of the type adh.

A sample of statements of any desired size may be constructed by using replications of statements corresponding to the different letter combinations. For example, by taking five statements for each "cell" defined by a letter combination, a sample of size 5 x 24 = 120 statements may be composed. As Stephenson has said, "Theoretically any number of such samples can be composed for the given design, and any one is in principle as representative of the theory as any other."[3]

Preliminary investigation showed the optimum length of the sort to be approximately 50 statements for group administration to be accomplished in one thirty-five minute classroom period. Statistical considerations indicated that if 51 statements were used the calculations of the correlation coefficients would be simplified. For these reasons, two statements were composed for each letter combination. One additional statement of the type aef, and two of the type bef were included to give a total of 51 statements. In the absence of any definite criterion for selection, these types were chosen for the additional three statements because of the seemingly greater psychological importance of "mental processes".

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3. Ibid., p. 489.

The statements themselves were adapted freely from a variety of sources including the Minnesota Multiphasic Personality Inventory, the S.R.A. Youth Inventory, and the criterion statements for the Rotter Incomplete Sentences Blank. In adapting these statements and in composing additional statements, clarity, brevity and language level of the subjects were important considerations.

After the list of statements had been completed, it was necessary to decide upon a fixed order of presentation. The following rules were used as approximate guides in ordering the statements so as to avoid the establishing of a "mental set" along one independency or level.

1. Successive statements should have different first identification letters.

2. Successive statements should have different third identification letters.

3. Successive statements should have different second identification letters unless this gives rise to a repetition of a letter combination before the entire set of letter combinations has been completed once.

4. Replications of statements corresponding to a given letter combination should not appear until the entire set of letter combinations has been completed once.

When the statements had been ordered in approximate conformity with these rules, they were numbered from 1 to 51. Appendix I of the present study contains a complete list of the statements, together with their identifying letter combinations and their numbers denoting the order in which they were presented in the administration of the sort. As presented to the subjects, the statements were in capitals on .8" x 1.9" white cards.

II. THE DISTRIBUTION OF STATEMENTS IN THE SORT

From a statistical viewpoint, one of the chief advantages of the forced-sort is that it obviates the necessity for an assumption about the form of the distribution of statements. This is accomplished by predetermining the number of statements permissible in each of a discrete set of categories, so that the resulting frequency distribution of statements coincides with the best normal approximation for the sample size.

In the present study, a set of 51 self-descriptive statements were sorted into eleven categories or intervals. The criterion of sorting was, in the first sort, the truth of the statement as it applied to the subject's actual concept of himself, and in the second sort, the truth of the statement as it applied to his ideal concept of himself. Eleven "truth categories", ranging from "Most True" to "Least True", were used in order that the discrimination between the relative truth of the statements might be reasonably fine, and because the use of nine or eleven categories has become common practice in the design of forced-sorts. Thus the eleven categories constitute an eleven point scale of truth. The number of statements permitted to correspond to any given point on the scale were prescribed so as to ensure the best approximation to the normal frequency distribution.

Table III gives the number of statements in each of the "truth categories", together with the identifying numbers which were assigned to each of these categories.

TABLE III. FREQUENCY DISTRIBUTION OF STATEMENTS IN ELEVEN "TRUTH CATEGORIES"

	"Least True"										"Most True"
"Truth Category" Number	0	1	2	3	4	5	6	7	8	9	10
Number of Statements	1	2	4	6	8	9	8	6	4	2	1

Appendix II of the present study contains details of the procedure and computations involved in normalizing the distribution of statements.

It has become common practice in the administration of forced-sorts, to have the subject sort the statements into piles: one pile for each category. This has the defect of preventing a continuous comparison of statements, since only the top statements in the piles are visible to the subject. It seemed advantageous, therefore, to seek a method of sorting whereby all of the statements would be visible at once.

A second difficulty arose from the necessity for administering the sort to a group of subjects, rather than to an individual. It is a simple matter for the person administering a forced-sort to an individual subject, to record the distribution of the statements. This advantage is lost in group administration. In the latter case, it is virtually essential that the subjects themselves record their own distributions.

Both of these difficulties were overcome by using a "distribution chart". This distribution chart consisted of eleven laterally distributed columns numbered from 0, on the left, to 10, on the right; the numbers corresponding to the "truth categories". Each column was divided into vertically distributed rectangles so that the number of rectangles in a given column corresponded to the number of statements in the corresponding "truth category". The rectangles were of slightly larger dimensions than the cards upon which the statements were printed. By sorting the statements onto the rectangles of the distribution chart, the subject was able to see all of the statements at once, and to rearrange them according to their relative truth. When the sort was completed, the statement numbers could then be recorded by the subject on the appropriate chart space. Provision was made on the chart for recording the subject's name, age and sex. The completed chart constituted a permament record of the sort, together with the necessary identifying data. Appendix III consists of a sample distribution chart of the type used in the present investigation.

III. PROCEDURE FOR ADMINISTERING THE SORT

Following the construction of the self-descriptive statements and the distribution chart, a tentative procedure for administering the sort was composed. The instructions for the administration of the forced-sort included an introductory paragraph designed to assist in establishing the proper rapport with the subjects. It was appreciated

from the outset of the investigation that the establishing and maintaining of rapport would be a difficult problem in the group administration of a forced-sort. In composing the instructions for administration, the need for clarity and the language level of the subjects were important considerations.

In the light of experience gained by administering the sort to a small group of individuals, the procedure was revised. In its final form, the administration procedure was printed in two columns. The column on the left of the page contained the procedure to be followed by the administrator, and the column on the right consisted of the instructions to the subjects. These were coordinated to facilitate the administration of the sort. Appendix IV of the present study contains the complete instructions for the administration of the forced-sort.

CHAPTER V

ADMINISTRATION OF THE SORT AND CONSOLIDATION OF THE RAW DATA

I. THE EXPERIMENTAL GROUP

In the latter part of January, 1955, the forced-sort described in the preceding chapter was administered to five classes of adolescent students. One of these was a Grade IX class in an Edmonton Junior High School. The other four were Grade X classes in a large Edmonton Composite High School. The raw data were obtained for 104 of these students, 62 of whom were boys, and 42 of whom were girls. The ages of these students ranged from 12 years 9 months to 18 years 7 months, with a mean age of 15 years 8 months. Gates et al.[1] quote the findings of Crampton and others which show that roughly ninety percent of all girls, and eighty-five percent of all boys, have reached puberty by 15 years 8 months.

Although no specific efforts were made to randomize the sample of students, it is felt that they represent a fairly typical cross section of adolescent students in the City of Edmonton. Inasmuch as scholastic ability may affect the variables of the present study, the Grade IX group may be considered as biased toward higher ability, since it was the highest of five ability-grouped classes in the school from which it was taken. The aggregate group of Grade X students adequately

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1. Arthur I. Gates, Arthur T. Jersild, T.R. McConnell and Robert C. Challman. Educational Psychology, The MacMillan Company, New York, 1950, pp. 54-55.

spanned the range of scholastic ability and socio-economic status for the school from which it was chosen.

Table IV classifies the sample of students by grade in school, by sex, and by age.

TABLE IV. CLASSIFICATION OF STUDENTS BY GRADE IN SCHOOL, SEX AND AGE

Grade	Age: Years and Months	12-6 to 13-11	14-0 to 14-11	15-0 to 15-11	16-0 to 16-11	17-0 to 17-11	18-0 to 18-11	Total	Mean Age*
IX	Boys	2	5	4	3	0	0	14	14-11
	Girls	1	8	6	1	0	0	16	14-11
X	Boys	0	0	25	15	7	1	48	16-2
	Girls	0	2	16	8	0	0	26	15-9
Total for Boys		2	5	29	18	7	1	62	15-11
Total for Girls		1	10	22	9	0	0	42	15-5
Total Students		3	15	51	27	7	1	104	15-8

* The mean ages are given to the nearest whole month.

II. THE ADMINISTRATION OF THE FORCED-SORT

Prior to the administration of the forced-sort, interviews were held with the teachers who were to act as administrators. During these interviews, the purpose of the investigation and the procedure for administering the forced-sort were discussed.

The sorts were conducted during the regular class periods of a course in Health and Personal Development, by the teachers of this course. One period was taken for the administration of the self-sort, and a second period, about a week later, for the ideal-sort. The self-sort was given first because it was felt that the concept of "the person one really is" would be easier to keep firmly in mind, than the concept of "the person one would most like to be", especially when the nature of the sort was unfamiliar.

After the administration of the self-sort, the statement cards were rearranged in their original order for use in the ideal-sort. From the point of view of convenience in consolidating the raw data, it would have been desirable to have both sorts recorded on the same distribution chart. However, it was felt that the possible influence of immediate knowledge of the self-sort on the ideal-sort would be an invalidating factor. For this reason, a new distribution chart was used for the ideal-sort.

Reports from the teachers who administered the sorts suggested ample time limits of forty minutes for the complete administration of the self-sort, and thirty minutes for the ideal-sort. They also

indicated that the instructions for administering the forced-sort were clear, and that very little individual explanation was necessary.

A rather heavy absence rate, during the period when the sorts were being given, resulted in a number of subjects taking only one of the sorts. The incompleteness of the data for these subjects necessitated their removal from the sample of students. Two subjects were eliminated because of their obviously frivolous attitude toward the sort, as evidenced by their signing absurd pseudonyms on their distribution charts. A few others were eliminated because of duplication and omission of statement numbers on the distribution charts. These eliminations may have been a biasing influence on the data, and point to one defect of the group administration of forced-sorts.

III. CONSOLIDATION OF THE RAW DATA

In consolidating the raw data, the initial step was to pair the distribution charts corresponding to the self and ideal-sorts for each of the subjects. Next, an identification number was assigned to each subject and placed on his distribution charts. Large data sheets were constructed for recording the identification number, grade, sex and age of each subject, and the truth category numbers corresponding to the positions of the statements on the distribution charts. These data were transferred from the distribution charts to the data sheets and the necessary eliminations made. The residual 104 subjects were then renumbered from 1 to 104. Appendix V includes all of the raw data upon which the present investigation was based.

CHAPTER VI

ANALYSIS OF THE DATA

In the present chapter, it will be convenient to introduce some new terms in order to reduce the repetition of awkward descriptive phrases. For example, the term "location" will refer to the truth category number corresponding to the position of a statement in one of the sorts. Thus to say that the ideal location of statement 48 was 3, means that on the ideal-sort, the position of statement 48 corresponded to truth category 3. Other new terms will be defined as they are introduced.

I. SELF-IDEAL CORRELATIONS

The first step in the analysis of the raw data was the calculation, for each subject, of the simple correlation between the locations of the 51 statements in the self-sort and in the ideal-sort. This resulted in 104 correlation coefficients for the entire group of subjects. Table V contains a complete list of these correlations in the column headed r_{12}; the subscript "1" denotes self-sort, and "2" denotes ideal-sort. It will be seen that these correlations range from - .208 to .824. The mean "z" for the group, using Fisher's method, was found to be .46 with a corresponding "r" of .43. The standard error of the mean "z" is .027 giving a "t ratio" of 16.8 which greatly exceeds the critical value of 2.63 for 103 degrees of freedom at the 1% level of

significance. Thus the mean correlation between the self and ideal-concepts for the group as a whole is highly significant.

TABLE V. SELF-IDEAL CORRELATIONS FOR THE EXPERIMENTAL GROUP

Subject No.	SEX	r_{12}	Subject No.	SEX	r_{12}	Subject No.	SEX	r_{12}	Subject No.	SEX	r_{12}
1	F	.336*	27	F	.484**	53	M	.164#	79	M	.484**
2	F	.244	28	F	.244	54	M	.640**x	80	M	.248
3	F	.376**	29	F	.384**	55	M	.628**	81	M	.312*
4	F	-.020#	30	F	.216	56	M	.424**	82	M	.532**
5	F	.492**	31	F	.448**	57	M	.308*	83	M	.124#
6	F	.612**	32	F	.560**	58	M	.576**	84	M	.388**
7	F	.612**	33	F	.436**	59	M	.256	85	M	.600**
8	F	.564**	34	F	.404**	60	M	.132#	86	M	.476**
9	F	.440**	35	F	.328*	61	M	.264	87	M	.052#
10	F	.728**x	36	F	-.208#	62	M	.172#	88	M	.156#
11	F	.536**	37	F	.420**	63	M	.672**x	89	M	.364**
12	F	.760**x	38	F	.824**x	64	M	.568**	90	M	.584**
13	F	-.060#	39	F	.268	65	M	.172#	91	M	.428**
14	F	.292*	40	F	.720**x	66	M	.572**	92	M	.776**x
15	F	.040#	41	F	.592**	67	M	.440**	93	M	.472**
16	F	.700**x	42	F	.284*	68	M	.416**	94	M	.136#
17	F	.268	43	M	.332*	69	M	.396**	95	M	.536**
18	F	.444**	44	M	.612**	70	M	.656**x	96	M	.620**
19	F	.688**x	45	M	.080#	71	M	.208	97	M	.292*
20	F	.204	46	M	.008#	72	M	.228	98	M	.364**
21	F	.372**	47	M	.680**x	73	M	.584**	99	M	.308*
22	F	-.124#	48	M	.780**x	74	M	.368**	100	M	.688**x
23	F	.092#	49	M	.532**	75	M	.552**	101	M	.632**x
24	F	.480**	50	M	.272	76	M	.592**	102	M	.576**
25	F	.032#	51	M	.784**x	77	M	.488**	103	M	.392**
26	F	.484**	52	M	.596**	78	M	.232	104	M	.436**

* Significant departure from "0" at 5% level of significance.
** Significant departure from "0" at 1% level of significance.
# In low self-acceptance group.
x In high self-acceptance group.

The standard deviation for the sample of "z" values was found to be .28. Thus a "z" value of .18 corresponds to one standard deviation below the mean, and .74 corresponds to one standard deviation above the mean. The corresponding "r" values are respectively, .18 and .63. It was decided to designate the group of subjects having self-ideal correlations below .18 as the low-self acceptance group, and those above .63 as the high self-acceptance group. The first of these groups was found to contain 17 subjects or 16.3% of the total group, and the second to contain 15 subjects or 14.4% of the total group.

In a statistically similar study involving the changes in the self and ideal-concepts as a result of client-centered counseling, Butler and Haigh[1] have illustrated the use of a test suggested by Tippett[2] for testing the significance of individual differences in a group of correlations when the mean correlation is significantly different from zero. The criterion for this test is

$$\chi^2 = (N - 3)\sum (z - \bar{z})^2 ,$$

where "n" is the number of subjects, and "N" is the number of statements in the forced-sort. The number of degrees of freedom is (n-1).

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1. John M. Butler and Gerard V. Haigh. "Changes in the Relation between Self-Concepts and Ideal Concepts Consequent upon Client-centered Counseling", from Carl R. Rogers and Rosalind F. Dymond. Psychotherapy and Personality Change, The University of Chicago, Chicago, 1954, pp.55-75.
2. L.H.C. Tippett. The Methods of Statistics, Williams and Norgate, London, 1937, p. 180.

For the set of correlations given in Table V, the value of chi square obtained from this formula was 385.1 which greatly exceeds the critical value[3] of 138.5 for 103 degrees of freedom at the 1% level of significance. Butler and Haigh have interpreted this significance as indicating the existence of distinct subpopulations in the subject population. The nature of the subpopulations cannot be inferred from the data of the present study. It would seem that "adjustment", "socio-economic status" and "cultural environment", among other factors, might be important determinants of the subpopulations. Sex differences will be discussed later in this chapter.

As a whole, the experimental group exhibits a significant relationship between the self-concept and self-ideal. In addition,

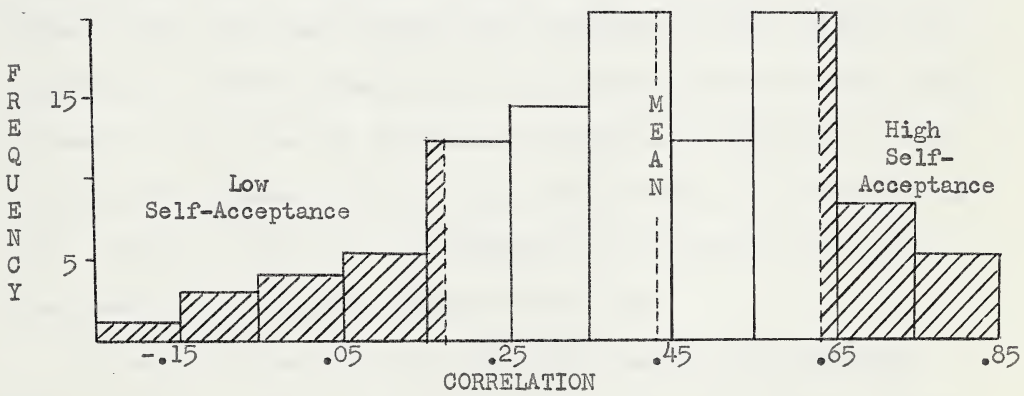

Figure 2. Histogram Showing the Distribution of Self-Ideal Correlations for 104 Adolescent Students.

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3. This critical value was calculated from the approximate formula, $\chi^2 \simeq \frac{1}{2}(\sqrt{2f-1} + u_p)^2$ where "f" stands for degrees of freedom, and u_p is the fractile of the normal distribution corresponding to a cumulative value of "p". For the 1% level, p = .99.

there are significant individual differences in the self-ideal relationship. Figure 2 illustrates the distribution of self-ideal correlations for the experimental group.

II. ANALYSIS OF THE GROUP IDEAL

A group ideal-sort was obtained by averaging the locations of each statement over the entire group of subjects, sorting the statements on a distribution chart according to their mean locations, and taking as the group location of a statement its resulting location on the chart.

The degree of concern which an individual feels for a given statement is related to the departure of its position from the centre of the distribution chart. A subject who places a statement in the centre column of the chart feels essentially indifferent to it. It will be convenient to define mathematically the concern associated with a given statement as the numerical difference between its location and 5, the location of a statement placed in the centre column of the distribution chart. Table VI summarizes the locations of statements in the group ideal-sort and the concern associated with them.

It was felt that one might find some areas of self-perception which exhibited greater concern than others for the adolescent. The statements were grouped by subject of perception[4] (body, bodily processes, mind and mental processes), and the mean concern found for

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4. Supra, pp. 17-20.

each grouping. Analysis of the differences between these means showed none of them to be significant. This will be intuitively evident to the reader by examining Table VII, where the mean concerns for the various areas of self-perception are seen to be remarkably close.

TABLE VI LOCATION AND CONCERN OF STATEMENTS IN THE GROUP IDEAL-SORT

Statement Number	Location	Concern	Statement Number	Location	Concern	Statement Number	Location	Concern
1	10	5	18	5	0	35	5	0
2	2	3	19	1	4	36	6	1
3	8	3	20	6	1	37	4	1
4	1	4	21	4	1	38	6	1
5	3	2	22	5	0	39	3	2
6	9	4	23	3	2	40	6	1
7	2	3	24	7	2	41	5	0
8	8	3	25	0	5	42	7	2
9	3	2	26	7	2	43	4	1
10	7	2	27	3	2	44	7	2
11	2	3	28	8	3	45	5	0
12	9	4	29	4	1	46	6	1
13	2	3	30	5	0	47	5	0
14	8	3	31	4	1	48	6	1
15	5	0	32	6	1	49	4	1
16	5	0	33	4	1	50	7	2
17	3	2	34	6	1	51	4	1

This may imply a fairly uniform concern for the different areas of perception of the self for the group as a whole. On the other hand, the apparent uniformity may simply reflect the rather limited coverage of these areas inherent in the sort itself, or the obscuring of significant individual differences in concern by the averaging process.

TABLE VII. MEAN CONCERNS FOR THE VARIOUS AREAS OF SELF-PERCEPTION

Body	Bodily Processes	Mind	Mental Processes
1.92	1.75	1.67	1.73

Table VIII summarizes the 14 statements of greatest concern to the group as a whole.

TABLE VIII STATEMENTS OF GREATEST CONCERN IN THE GROUP IDEAL-SORT

Statement Number	Letter Combination	Concern	Statement
1	aei	5	I am good-looking.
25	beh	5	I am hard of hearing.
4	bef	4	My feelings are easily hurt.
12	aeg	4	I have a good sense of humour.
6	adh	4	I am as good at sports as most people.
19	bei	4	I have poor skin.
8	acf	3	I feel good about my honesty .
14	adf	3	I am as ambitious as most people.
13	bef	3	I am usually nervous.
3	adg	3	I am as smart as most people.
7	beg	3	I am slow at arithmetic.
2	bch	3	I worry about my health.
11	bdh	3	I am clumsier than most people.
28	aei	3	I have good teeth.

By averaging the ideal-concept over the entire group of subjects,

the important area of sex differences is obscured. For this reason, separate group ideal-sorts were derived for the girls and boys. The method used was the same as that described above for the total group. Although the analysis of sex differences in these group ideal-sorts will be left to a later section, their individual analyses will be discussed at this point. The locations (L) and concerns (C) of the statements in these groups are included in Table IX below.

TABLE IX LOCATION AND CONCERN OF STATEMENTS IN THE GROUP IDEAL-SORTS BOYS AND GIRLS

Statement Number	Boys		Girls		Statement Number	Boys		Girls		Statement Number	Boys		Girls	
	L	C	L	C		L	C	L	C		L	C	L	C
1*	10	5	10	5	18	6	1	5	0	35	4	1	5	0
2*	2	3	2	3	19*	1	4	1	4	36	5	0	6	1
3*	9	4	9	4	20	8	3	5	0	37	3	2	4	1
4	1	4	0	5	21*	4	1	4	1	38	5	0	7	2
5*	3	2	3	2	22	5	0	6	1	39	3	2	4	1
6	9	4	8	3	23*	3	2	3	2	40*	6	1	6	1
7	2	3	1	4	24*	7	2	7	2	41*	5	0	5	0
8	7	2	8	3	25	0	5	2	3	42	6	1	8	3
9	4	1	2	3	26	6	1	7	2	43	5	0	4	1
10	7	2	6	1	27	2	3	3	2	44	8	3	6	1
11	3	2	2	3	28*	7	2	7	2	45*	5	0	5	0
12	8	3	9	4	29*	4	1	4	1	46*	6	1	6	1
13	2	3	3	2	30	7	2	5	0	47	4	1	5	0
14*	8	3	8	3	31	4	1	3	2	48*	6	1	6	1
15	5	0	4	1	32	5	0	7	2	49*	4	1	4	1
16	6	1	5	0	33	5	0	4	1	50*	7	2	7	2
17*	3	2	3	2	34*	6	1	6	1	51	4	1	5	0

* Same location in both group sorts.

The mean concerns for each of the areas of self-perception were calculated for both the group ideal-sorts. Intra-sex differences in these means were found to be not significant at the 5% level, although the mean concern for "mental processes" exceeded that for "bodily processes" significantly at the 6% level for girls. The test used for examining the significance of the differences between these means was a distribution-free test developed by van der Waerden.[5] This test is used extensively in the analysis of the data in the subsequent sections of this chapter. The usual Student's Test for the difference in means requires homogeneity of variances and an assumption of normality about the form of the distributions. Neither of these requirements could be satisfied with any degree of certainty for the distribution of concerns. Indeed, preliminary examination of this distribution showed it to be markedly skewed. For these reasons, van der Waerden's test proved to be an invaluable tool. A discussion of its theory and application will be found in Appendix VI of the present study.

Table X summarizes the mean concerns for the various areas of perception of the self for both the boys' and the girls' group ideal-sorts. In the column headed "Mental Factors", the concerns for the areas of "Mind" and "Mental Processes" have been combined. Similarly, "Body" and "Bodily Processes" have been combined under "Physical Factors".

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5. B.L. van der Waerden. "Ein neuer Test für das Problem der zwei Stichproben", Mathematische Annalen, CXXVI, pp. 93-107.

TABLE X MEAN CONCERNS FOR THE VARIOUS AREAS OF SELF-PERCEPTION FOR BOYS' AND GIRLS' IDEAL-SORTS

Group Ideal-Sort	Body	Bodily Processes	Mind	Mental Processes	Mental Factors	Physical Factors
Boys	1.83	2.08	1.67	1.47	1.55	1.96
Girls	1.83	1.33	2.00	2.13	2.07	1.58

Table XI summarizes the six statements of greatest concern to the group of girls, and the six statements of greatest concern to the group of boys.

TABLE XI STATEMENTS OF GREATEST CONCERN IN THE BOYS' AND GIRLS' GROUP IDEAL-SORTS

Statement Number	Letter Combination	Concern	Statement
Boys			
1	aei	5	I am good-looking.
25	beh	5	I am hard of hearing.
19	bei	4	I have poor skin.
6	adh	4	I am as good at sports as most people.
3	adg	4	I am as smart as most people.
4	bef	4	My feelings are easily hurt.

TABLE XI (continued)

Statement Number	Letter Combination	Concern	Statement
Girls			
1	aei	5	I am good-looking.
4	bef	5	My feelings are easily hurt.
19	bei	4	I have poor skin.
7	beg	4	I am slow at arithmetic.
12	aeg	4	I have a good sense of humour.
3	adg	4	I am as smart as most people.

III. RELATIONS BETWEEN THE SELF-CONCEPTS AND THE GROUP IDEAL-CONCEPTS

Having derived group ideal-sorts for the boys and girls, it seemed natural to consider their relationship to the self-sorts of individual subjects. In a sense, the degree of relatedness of a subject's self-concept to the ideal-concept of the group of which he is a member, is a measure of his social acceptance. It may also be interpreted in terms of the influence of the group ideal on his stated self-concept. In other words, a subject may be influenced to some extent in his expressed description of himself, by his conscious or unconscious appreciation of what the group considers to be ideal.

The first step in analyzing the relationship between the self-concepts and the group self-ideals was the calculation, for each subject, of the correlation between the locations of the 51 statements in the self-sort and their locations in the appropriate group ideal-sort.

Thus the girls' self-sorts were correlated with the girls' group ideal-sort, and similarly for the boys. The resulting correlation coefficients are listed in Table XII under the heading r_{13}: the subscript "1" denotes self-sort, and "3" denotes ideal-sort. It will be seen that these correlations range from -.264 to .720. The mean "z" for the group was found to be .46 with corresponding mean "r" of .43. It is of interest to note that these are the same as those found in the self-ideal analysis in Section I of the present chapter.[6] The standard error of the mean "z" was found to be .022 resulting in a "t" ratio of 20.7 which greatly exceeds the 1% critical value of 2.63 for 103 degrees of freedom. It may be concluded that there is a highly significant degree of relatedness between self and group ideal-concepts for the group as a whole.

The standard deviation for the "z" values was found to be .23 This gives a range of "z" values of .23 to .69 from one standard deviation below the mean to one standard deviation above the mean. The corresponding range for r_{13} is from .23 to .60. The set of subjects having self - group ideal correlations below .23 were termed the low group acceptance set; those above .60 constitute the high group acceptance set. The first of these groups contains 17 subjects, or 16.3% of the total group; the second contains 15 subjects, or 14.4% of the total group. These are the same percentages found for the low and high self-acceptance groups in Section I of the present chapter.[7]

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6. Supra, p. 47.
7. Supra, p.49.

TABLE XII CORRELATIONS BETWEEN THE SELF-SORTS AND GROUP IDEAL-SORTS

Subject No.	SEX	r_{13}	Subject No.	SEX	r_{13}	Subject No.	SEX	r_{13}	Subject No.	SEX	r_{13}
1	F	.104#	27	F	.544**x	53	M	.124#	79	M	.672**x
2	F	.360**	28	F	.236	54	M	.464**	80	M	.328*
3	F	.440**	29	F	.476**	55	M	.596**	81	M	.492**
4	F	-.024#	30	F	.392**	56	M	.488**	82	M	.492**
5	F	.436**	31	F	.400**	57	M	.428**	83	M	.140#
6	F	.492**	32	F	.464**	58	M	.628**x	84	M	.460**
7	F	.512**	33	F	.388**	59	M	.460**	85	M	.604**x
8	F	.436**	34	F	.512**	60	M	.100#	86	M	.516**
9	F	.436**	35	F	.556**	61	M	.392**	87	M	-.020#
10	F	.608**x	36	F	-.004#	62	M	.312*	88	M	.340*
11	F	.392**	37	F	.472**	63	M	.596**	89	M	.308*
12	F	.692**x	38	F	.612**x	64	M	.560**	90	M	.328*
13	F	.072#	39	F	.228#	65	M	.268	91	M	.440**
14	F	.144#	40	F	.588**	66	M	.652**x	92	M	.468**
15	F	.168#	41	F	.600**	67	M	.560**	93	M	.644**x
16	F	.680**x	42	F	.268	68	M	.536**	94	M	.136#
17	F	.376**	43	M	.504**	69	M	.372**	95	M	.692**x
18	F	.440**	44	M	.364**	70	M	.588**	96	M	.540**
19	F	.616**x	45	M	.268	71	M	.268	97	M	.064#
20	F	.184#	46	M	.124#	72	M	.480**	98	M	.428**
21	F	.308*	47	M	.612**x	73	M	.408**	99	M	.372**
22	F	-.264#	48	M	.592**	74	M	.396**	100	M	.476**
23	F	.244	49	M	.448**	75	M	.584**	101	M	.532**
24	F	.460**	50	M	.300*	76	M	.572**	102	M	.720**x
25	F	.148#	51	M	.640**x	77	M	.660**x	103	M	.400**
26	F	.472**	52	M	.572**	78	M	.324*	104	M	.388**

* Significant departure from "0" at 5% level of significance.
** Significant departure from "0" at 1% level of significance.
# In low group acceptance set.
x In high group acceptance set.

However, the subjects constituting the high and low self-acceptance groups are not necessarily those who are included in the high and low

group-acceptance sets. The amount of duplication of subjects in the low and high groups is sufficiently marked to invite the hypothesis that subjects who are low (or high) in one of the classifications, tend to be low (or high) in the other classification. In order to test this hypothesis, a two way contingency table was constructed and the subjects classified according to the degree of their self-acceptance and group acceptance. In order to complete the classification for all of the subjects, it was necessary to introduce intermediate categories of medium self-acceptance and medium group acceptance. Table XIII is the resulting contingency table. The coefficient of contingency calculated from this table was found to be .595.[8] Using the formula -

TABLE XIII CONTINGENCY TABLE FOR EXAMINING THE RELATIONSHIP BETWEEN SELF-ACCEPTANCE AND GROUP ACCEPTANCE

		Self-Acceptance			
	Classification	Low	Medium	High	Totals
Group Acceptance	Low	12	5	0	17
	Medium	5	59	8	72
	High	0	8	7	15
	Totals	17	72	15	104

8. For the method of calculating this coefficient, the reader is referred to, Henry E. Garrett. Statistics in Psychology and Education, Longmans, Green and Co., New York, 1953, pp.368-371.

$$C = \sqrt{\frac{\chi^2}{N + \chi^2}}$$

the value of chi square[9] was found to be 56.6 which greatly exceeds the critical value of 13.28 for four degrees of freedom at the 1% level of significance. Thus the hypothesis is strongly supported.

Using the method described in Section I of this chapter, the group of self - group ideal correlations was tested for the existence of significant differences. A chi square value of 253.4 was obtained. This exceeds the critical value of 138.5 for 103 degrees of freedom at the 1% level of significance. Thus significant individual differences or subpopulations are seen to exist.

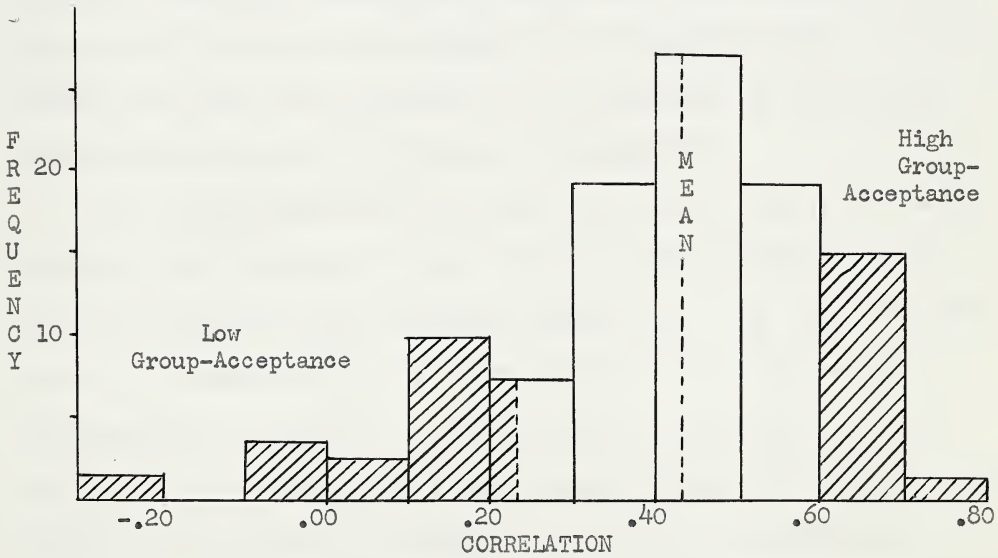

Figure 3. Histogram Showing the Distribution of Self - Group Ideal Correlations for 104 Adolescent Subjects.

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9. In this formula, "C" stands for coefficient of contingency and "N" for the sample size.

Figure 3 illustrates the distribution of self - group ideal correlations for the entire experimental group.

IV. RELATIONS BETWEEN THE IDEAL-CONCEPTS AND THE GROUP IDEAL-CONCEPTS

Whether or not an adolescent wishes to resemble the ideal of the group of which he is a member has important social implications. Persons who direct their self-development decidedly away from the general direction of the group goal are commonly referred to as "misfits". They necessarily experience frustration and tend to become social isolates.

It was felt that an indication of the incidence of adolescent "misfits", and their counterparts, the socially well integrated adolescents, could be obtained by studying the relationship between the ideal-concepts and group ideal-concepts of the adolescents who constituted the experimental group of the present investigation.

The correlation between the ideal-sort and the appropriate group ideal-sort was calculated for each subject. These correlations are listed in Table XIV under the column heading r_{23}. They range from .300 to .912. The mean "z" for the group was found to be .89, and the corresponding "r" was .71. A standard error of the mean"z" of .023 resulted in a "t ratio" of 38.6 which greatly exceeds the critical value of 2.63 for 103 degrees of freedom at the 1% level of significance. For the group as a whole, it follows that there is a highly significant degree of correspondence between ideal and group ideal concepts.

TABLE XIV CORRELATIONS BETWEEN THE IDEAL-SORTS AND THE GROUP IDEAL-SORTS

Subject No.	SEX	r_{23}	Subject No.	SEX	r_{23}	Subject No.	SEX	r_{23}	Subject No.	SEX	r_{23}
1	F	.820**x	27	F	.720**	53	M	.796**	79	M	.432**#
2	F	.776**	28	F	.624**	54	M	.656**	80	M	.728**
3	F	.832**x	29	F	.860**x	55	M	.812**x	81	M	.572**
4	F	.780**	30	F	.780**	56	M	.572**	82	M	.708**
5	F	.812**x	31	F	.652**	57	M	.548**#	83	M	.312*#
6	F	.696**	32	F	.312*#	58	M	.728**	84	M	.748**
7	F	.880**x	33	F	.744**	59	M	.588**	85	M	.760**
8	F	.728**	34	F	.740**	60	M	.624**	86	M	.708**
9	F	.876**x	35	F	.688**	61	M	.744**	87	M	.788**
10	F	.828**x	36	F	.672**	62	M	.340*#	88	M	.680**
11	F	.912**x	37	F	.796**	63	M	.732**	89	M	.732**
12	F	.812**x	38	F	.776**	64	M	.724**	90	M	.568**#
13	F	.836**x	39	F	.668**	65	M	.300*#	91	M	.688**
14	F	.668**	40	F	.844**x	66	M	.780**	92	M	.620**
15	F	.804**	41	F	.732**	67	M	.560**#	93	M	.656**
16	F	.808**	42	F	.772**	68	M	.756**	94	M	.556**#
17	F	.728**	43	M	.608**	69	M	.580**	95	M	.756**
18	F	.668**	44	M	.676**	70	M	.724**	96	M	.600**
19	F	.704**	45	M	.556**#	71	M	.776**	97	M	.696**
20	F	.828**x	46	M	.828**x	72	M	.612**	98	M	.788**
21	F	.500**#	47	M	.816**x	73	M	.464**#	99	M	.736**
22	F	.784**	48	M	.708**	74	M	.516**#	100	M	.632**
23	F	.448**#	49	M	.716**	75	M	.596**	101	M	.580**
24	F	.800**	50	M	.824**x	76	M	.492**#	102	M	.776**
25	F	.676**	51	M	.724**	77	M	.664**	103	M	.800**
26	F	.844**x	52	M	.648**	78	M	.656**	104	M	.644**

* Significant departure from "0" at 5% level of significance.
** Significant departure from "0" at 1% level of significance.
# In low socially integrated group.
x In high socially integrated group.

The standard deviation for the observed "z" values was found to be .24. This results in a range of "z" values of .65 to 1.13 from one standard deviation below the mean "z" to one standard deviation above it.

The standard deviation for the observed "z" values was found to be .24. This results in a range of "z" values of .65 to 1.13 from one standard deviation below the mean "z" to one standard deviation above it. The corresponding range for "r" is from .57 to .81. The set of subjects having ideal - group ideal correlations below .57 were termed the low socially integrated group, and those above .81 were called the high socially integrated group. The first of these groups was found to contain 15 subjects or 14.4% of the total group, and the second to contain 17 subjects or 16.3% of the total group. These percentages are just the reverse of those found for the low and high group-acceptance and self-acceptance groups. As in the preceding section, contingency tables were constructed to examine the coincidence of subjects in the various groupings. Table XV is the contingency table which classifies the subjects by self-acceptance and social integration and Table XVI classifies them by group-acceptance and social integration.

TABLE XV CONTINGENCY TABLE FOR EXAMINING THE RELATIONSHIP BETWEEN SELF-ACCEPTANCE AND SOCIAL INTEGRATION

		Self-Acceptance			
Social Integration	Classification	Low	Medium	High	Totals
	Low	6	9	0	15
	Medium	9	52	11	72
	High	2	11	4	17
	Totals	17	72	15	104

A contingency coefficient of .295 was obtained for the distribution of subjects in Table XV. This resulted in a chi square value of 9.5 which slightly exceeds the critical value of 9.488 for four degrees of freedom at the 5% level of significance. Thus there is evidence to support the hypothesis that persons, in this case adolescents, who exhibit high self-acceptance tend to be well integrated socially.

From Table XVI, a contingency coefficient of .139 was obtained. The corresponding chi square of 2.04 is not significant. There was no observed tendency for adolescents with high (or low) group-acceptance to be well (or poorly) integrated socially. In other words, subjects whose self-concepts fail to resemble the group ideal were not observed to exhibit significantly different ideal-concepts from that of the group of which they were members.

TABLE XVI CONTINGENCY TABLE FOR EXAMINING THE RELATIONSHIP BETWEEN GROUP-ACCEPTANCE AND SOCIAL INTEGRATION

		Group-Acceptance			
Social Integration	Classification	Low	Medium	High	Totals
	Low	2	12	1	15
	Medium	11	50	11	72
	High	4	10	3	17
	Totals	17	72	15	104

Figure 4 illustrates the distribution of ideal - group ideal correlations for the entire group.

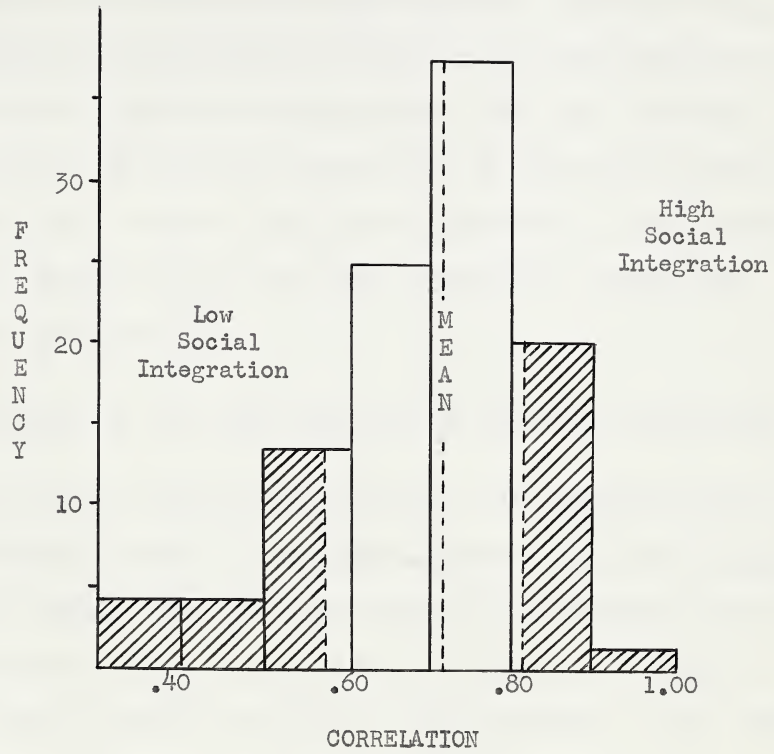

Figure 4. Histogram Showing the Distribution of Ideal - Group Ideal Correlations for 104 Adolescent Subjects.

The test for the existence of significant individual differences in the ideal - group ideal correlations gave a calculated chi square value of 274.0 which greatly exceeds the critical value of 138.5 for 103 degrees of freedom at the 1% level of significance. This supplies further evidence for the existence of significant subpopulations. The

recurring evidence of significant subpopulations invites investigation of their determinants. This would seem to offer a rich field of investigation by the methods of factor analysis. Butler and Haigh have speculated on the possible existence of self-ideal patterns and their relation to personality integration. They say, "In brief, certain patterns of the self-ideal Gestalt may be discovered to indicate certain patterns or types of personality integration. It is possible that factor analysis of the self-ideal sortings may isolate such fundamental patterns."[10]

V. THE INFLUENCE OF THE GROUP IDEAL ON THE SELF-IDEAL RELATIONSHIP

As was seen in the preceding section, self-acceptance seems to be significantly related to both group-acceptance and social integration. This suggests that the group ideal is an influential factor in the relationship between the self-concept and the ideal-concept.

In order to examine the nature of this influence, it was decided to use partial correlative analysis to render constant the influence of the group ideal, and to examine the residual self-ideal relationship. By contrasting the residual relationship with the original, it was possible to obtain an indication of the group ideal's influence.

The partial correlations are listed in Table XVII. They will be seen to range from -.277 to .751. The original simple correlations

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10. Butler and Haigh, op. cit., p. 62.

TABLE XVII PARTIAL CORRELATIONS BETWEEN THE SELF AND IDEAL-SORTS WITH THE GROUP IDEAL HELD CONSTANT

Subject No.	SEX	$r_{12.3}$	Subject No.	SEX	$r_{12.3}$	Subject No.	SEX	$r_{12.3}$	Subject No.	SEX	$r_{12.3}$
1	F	.441**	27	F	.159	53	M	.109	79	M	.290*
2	F	-.060	28	F	.127	54	M	.502**	80	M	.014
3	F	.020	29	F	-.057	55	M	.307*	81	M	.043
4	F	-.002	30	F	-.156	56	M	.202	82	M	.299*
5	F	.263	31	F	.269	57	M	.097	83	M	.085
6	F	.431**	32	F	.493**	58	M	.223	84	M	.075
7	F	.396**	33	F	.239	59	M	-.018	85	M	.272
8	F	.356*	34	F	.044	60	M	.090	86	M	.183
9	F	.134	35	F	-.090	61	M	-.045	87	M	-.127
10	F	.505**	36	F	-.277	62	M	.074	88	M	-.109
11	F	.473**	37	F	.083	63	M	.431**	89	M	.214
12	F	.470**	38	F	.751**	64	M	.285*	90	M	.512**
13	F	-.220	39	F	.160	65	M	.100	91	M	.192
14	F	.266	40	F	.516**	66	M	.134	92	M	.701**
15	F	-.162	41	F	.280*	67	M	.146	93	M	.086
16	F	.386**	42	F	.126	68	M	.017	94	M	.073
17	F	-.009	43	M	.037	69	M	.238	95	M	.027
18	F	.225	44	M	.533**	70	M	.413**	96	M	.440**
19	F	.455**	45	M	-.086	71	M	.000	97	M	.345*
20	F	.094	46	M	-.170	72	M	-.095	98	M	.048
21	F	.265	47	M	.373**	73	M	.488**	99	M	.054
22	F	.139	48	M	.634**	74	M	.208	100	M	.568**
23	F	-.020	49	M	.338*	75	M	.313*	101	M	.469**
24	F	.187	50	M	.046	76	M	.435**	102	M	.040
25	F	-.093	51	M	.605**	77	M	.089	103	M	.131
26	F	.181	52	M	.361*	78	M	.027	104	M	.264

* Significant departure from "0" at 5% level of significance.
** Significant departure from ")" at 1% level of significance.

were found to range from -.208 to .824.[11] This suggests a general lowering of the self-ideal relationship when the influence of the

11. Supra, p. 47.

group ideal is held constant. For only three subjects (Numbers 1, 22 and 97) did the partial correlation exceed the simple correlation. The mean partial correlation was found to be .22 compared with the original mean simple correlation of .43. Some of the possible causes for this lowering will be discussed in Chapter VII. Figure 5 shows the distribution of self-ideal partial correlations with the group ideal held constant.

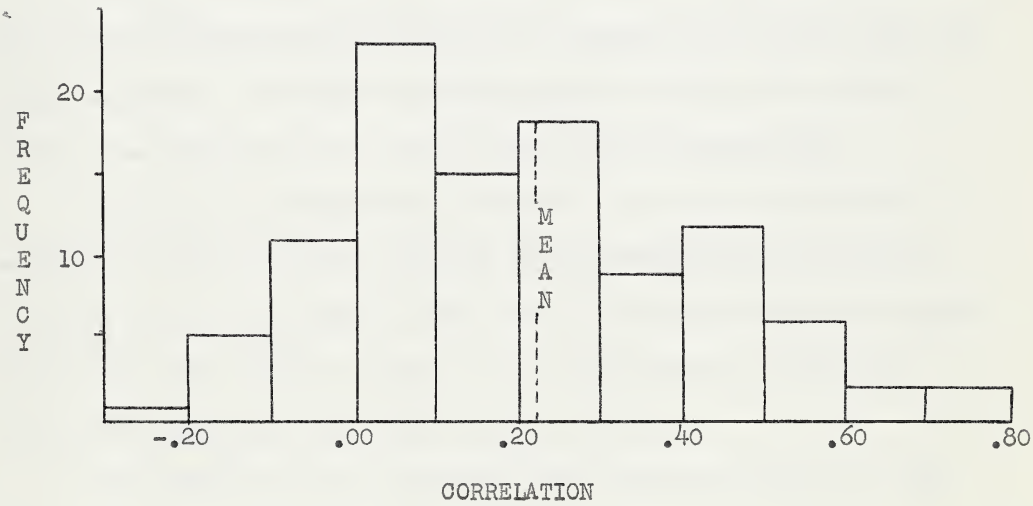

Figure 5. Histogram Showing the Distribution of Self-Ideal Partial Correlations Holding Group Ideal Constant, for 104 Adolescent Subjects.

VII. ANALYSIS OF DISSATISFACTION WITH SELF

An individual indicates dissatisfaction with himself when his ideal-concept differs from his self-concept. It will be convenient to define the mathematical dissatisfaction associated with a given state-

ment on the forced-sort as the numerical difference between its self and ideal locations. For a group of individuals, the group dissatisfaction of a given statement will be the numerical difference between the average self and the average ideal locations taken over the entire group. The group dissatisfaction associated with a set of statements will be the average of the individual group dissatisfactions for the set.

Rather than considering the group of subjects as a whole, in studying the dissatisfaction with self, it was decided to treat the boys and girls separately. This had the advantage of permitting the examination of sex differences at a later stage of the investigation.

The group dissatisfactions for each of the sets of statements associated with the various areas of self-perception were calculated for both the boys and girls. Since each of these group dissatisfactions were means, they could be tested for the significance of intra-sex differences by means of van der Waerden's test.

Table XVIII shows the resulting group dissatisfactions for each of the areas of perception of the self.

TABLE XVIII GROUP DISSATISFACTIONS BY SEX FOR THE VARIOUS AREAS OF SELF-PERCEPTION

Sex	Mental Processes	Mind	Bodily Processes	Body
Girls	.68	1.00	.62	.98
Boys	.53	.66	.59	.66

Intra-sex differences in these group dissatisfactions are shown in Table XIX.

TABLE XIX INTRA-SEX DIFFERENCES IN GROUP DISSATISFACTIONS FOR THE VARIOUS AREAS OF SELF-PERCEPTION

	Boys			Girls			
Area	Ment. Proc.	Mind	Bod. Proc.	Area	Ment. Proc.	Mind	Bod. Proc.
Mind	.13			Mind	.32*		
Bod. Proc.	.06	.07		Bod. Proc.	.06	.38*	
Body	.13	.00	.07	Body	.31	.04	.34

* Difference in dissatisfactions significantly greater than "0" at 5% level of significance.

No significant differences were observed between the group dissatisfactions associated with the various areas of self-perception for the boys. For the girls, it was found that the group dissatisfaction in the area of "Mind" was significantly greater than in the areas of "Mental Processes" or "Bodily Processes".

It may seem curious that the difference in group dissatisfaction between the areas of "Body" and "Bodily Processes", for the girls, was not found to be significant, although the smaller difference between the areas of "Mind" and "Mental Processes" was found to be significant.

This can be explained by the nature of van der Waerden's test which depends solely on the numerical order of the observations, and not on their size, except as the order is determined by size. This may, at first consideration, seem a defect in the test, however, it has the advantage of minimizing the influence of isolated extreme observations. In the present instance, the group dissatisfaction for a single statement (Number 1) was responsible for raising the group dissatisfaction in the area of "Body" to a relatively high level. This had the effect of making the group dissatisfaction in the area of "Body" unrepresentative of the dissatisfaction associated with the area as a whole. This defect was automatically corrected by van der Waerden's test.

VIII. ANALYSIS OF SEX DIFFERENCES

The data of the present study offered a variety of opportunities for the study of sex differences in the various aspects of the self. Rather than treating these in the preceding sections, it was decided to group them in a single section in order to give a more uniform picture of sex differences.

The mean self-ideal, self - group ideal and ideal - group ideal correlations were calculated for both the boys and girls. Each of these was tested for significance of departure from zero by Fisher's method. All were found to be highly significant. In addition, each set of correlations, which determined the mean correlations, were tested for the existence of significant individual differences by the method

TABLE XX SELF-IDEAL, SELF - GROUP IDEAL AND IDEAL - GROUP IDEAL CORRELATIONS BY SEX

Parameter*	r_{12}		r_{13}		r_{23}	
	Boys	Girls	Boys	Girls	Boys	Girls
$\bar{z}$	.48	.43	.49	.41	.82	1.00
S.E.$\bar{z}$	.033	.048	.027	.037	.026	.037
"t ratio"	14.7	9.0	18.4	10.9	31.5	27.1
d.f.	61	41	61	41	61	41
C.V. t (1%)	2.66	2.71	2.66	2.71	2.66	2.71
$\bar{r}$	.45**	.40**	.45**	.39**	.67**	.76**
χ^2	193.3	188.8	129.3	116.4	122.7	112.3
C.V.χ^2 (1%)	89.6	65.0	89.6	65.0	89.6	65.0
$\bar{r}$ (Boy)- $\bar{r}$ (Girl)	.05		.06		-.09	

* Some of the abbreviations of the parameters require explanation. They are as follows:

$\bar{z}$ - the mean "z", using Fisher's method.
S.E. z - the standard error of z.
d.f. - degrees of freedom.
C.V. t(1%) - the tabulated critical value of "Student's -t" at the 1% level of significance for the number of degrees of freedom indicated.
$\bar{r}$ - the mean correlation corresponding to $\bar{z}$.
χ^2 - the value of chi square found by Tippett's formula for testing for the existence of significant individual differences.
C.V. χ^2 (1%) - the tabulated critical value of chi square at the 1% level of significance for the number of degrees of freedom indicated.

** Significant departure from "0" at the 1% level of significance.

described in Section I of the present chapter. All of these sets were found to contain highly significant individual differences.

The sex differences in the mean correlations were calculated, and tested for significance of departure from zero. None of these differences proved to be significant.

Table XX summarizes the analysis of the correlations described above.

The subjects were classified by sex and by the relative magnitude of their self-ideal and self - group ideal correlations, to determine whether or not there was a significant tendency for the self-ideal correlations of one sex to exceed the self - group ideal correlations more frequently than for the other sex. A contingency table was constructed which classified the subjects in this manner. Table XXI shows the manner in which the subjects were classified.

TABLE XXI CLASSIFICATION OF SUBJECTS BY SEX AND BY THE RELATIVE MAGNITUDE OF THEIR SELF-IDEAL AND SELF - GROUP IDEAL CORRELATIONS

Sex	r_{12} greater than r_{13}	r_{13} greater than r_{12}	Totals
Boys	(A) 27	(B) 35	62
Girls	(C) 27	(D) 15	42
Totals	54	50	(N)104

Using the criterion,[12]

$$\chi^2 = \frac{N(AD - BC)^2}{(A + B)(C + D)(A + C)(B + D)} ,$$

where the letters have the numerical values shown in the table, a chi square value of 4.31 was obtained. This exceeds the critical value of 3.84 for 1 degree of freedom at the 5% level of significance. It follows that significantly more girls than boys have a self-ideal correlation that exceeds their self - group ideal correlation.

The percentages of boys and girls in the low and high self-sccept-ance, group-acceptance, and social integration groups were calculated. Table XXII summarizes these percentages and the sex differences between them. The percentages for the girls are of the total number of girls, and similarly for the boys.

TABLE XXII PERCENTAGES BY SEX OF SUBJECTS IN THE HIGH AND LOW SELF-ACCEPTANCE, GROUP-ACCEPTANCE AND SOCIAL INTEGRATION GROUPS

Sex	Self-Acceptance		Group-Acceptance		Social Integration	
	Low	High	Low	High	Low	High
Boys	16.1%	14.5%	11.3%	16.1%	19.4%	6.5%
Girls	16.7%	14.3%	23.8%	11.8%	7.1%	30.9%
%Boys-% Girls	-0.6%	0.2%	-12.5%	4.3%	12.3%	-24.4%*

* Significant departure from "0" at the 5% level of significance.

12. Garrett, op. cit., p. 265.

In the classification "high social integration", the percentage of girls was found to be significantly greater than that of boys. Otherwise, no significant sex differences in percentages were found.

The sex differences in the mean concerns and group dissatisfactions for each of the areas of self-perception were computed, and their significances tested by van der Waerden's test. Although none of these differences was found to be significant, the girls seemed to exhibit consistently greater dissatisfaction with self than did the boys. This is suggested in Table XXIII where the group dissatisfaction for the girls is seen to be greater than that for the boys in all areas of self-perception. There also appeared to be a tendency for the girls to show greater concern for the "Mental" area of self-perception, and for the boys to be more concerned with the "Physical" area.

In order to obtain a measure of the similarity of the boys' and girls' group ideal-concepts, it was decided to compute the simple correlation between the boys' and girls' group ideal-sorts. This resulted in a correlation of .880 whose departure from zero is significant at the 1% level. There appears, therefore, to be a highly significant relationship between the group ideal-concepts of the boys and girls who constituted the subjects of the present investigation.

Table XXIII summarizes the group dissatisfactions and mean concerns by sex, for each area of perception of the self. It also indicates sex differences in these quantities.

TABLE XXIII GROUP DISSATISFACTIONS AND MEAN CONCERNS BY SEX FOR THE VARIOUS AREAS OF SELF-PERCEPTION

Sex	Ment. Proc.*		Mind		Bod. Proc*		Body	
	Con*	Diss.*	Con.	Diss.	Con.	Diss.	Con.	Diss.
Boys	1.47	.53	1.67	.66	2.08	.59	1.83	.66
Girls	2.13	.68	2.00	1.00	1.33	.62	1.83	.96
Boys-Girls	-.66	-.15	-.33	-.34	.65	-.03	.00	-.30

* The abbreviations have the following meanings:
Ment. Proc. - Mental Processes
Bod. Proc. - Bodily Processes
Con. - Mean concern
Diss. - Group Dissatisfaction.

CHAPTER VII

CONCLUSIONS AND RECOMMENDATIONS FOR FURTHER STUDY

It is not intended that the conclusions drawn in this chapter should apply beyond the experimental group of the present investigation. At best, they can serve as hypotheses to be tested on a wider scale. It would be tedious to repeat this qualification with the statement of each conclusion to which it is intended to apply. Instances in which extrapolation beyond the experimental group seems justified will be discussed explicitly.

I. GROUP ADMINISTRATION OF THE FORCED-SORT

It has been customary for forced-sorts to be administered individually. In the present study, an attempt was made to administer a self-ideal forced-sort to several classes of adolescent students. This was facilitated by the use of a distribution chart which permitted the continuous comparison of the self-descriptive statements, and made it possible for each subject to record his own sort and identifying data. The chart also served as a permanent record of the sort.

Certain defects were observed in the group approach. Difficulty was experienced in establishing the proper rapport with a few of the subjects. Perhaps this could be corrected by a more intensive orientation of the subjects in the purposes of the sort. A few errors in recording the sort were observed. This defect could probably be eliminated by having the students check their distribution charts more carefully.

Another difficulty was the loss of data due to absenteeism. This could be corrected by having both the self and ideal-sorts carried out during one session. However, this raises problems of "mental set" in changing immediately from the viewpoint of "self" to that of "ideal".

It is also possible that there is a more pronounced tendency in group administration, than in individual administration, for subjects to conceal their true attitudes toward themselves. This hypothesis might be verified or rejected experimentally.

II. RELATIONSHIPS AMONG THE SELF-CONCEPT, THE IDEAL-CONCEPT AND THE GROUP IDEAL-CONCEPTS

Moderate, but highly significant, linear relationships were found to exist between the self and ideal-concepts for the group as a whole, and for its constituent groups of boys and girls. The total group and the constituent groups were found to contain significant individual differences in the self-ideal relationship. This suggests the presence of significant subpopulations whose determinants might serve as a rewarding subject for further investigation. The methods of factor analysis would seem to be appropriate to such a study.

Group ideal-sorts were derived for the total group and for the groups of boys and girls. Significant moderate linear relationships were found between each of these group ideal-sorts and the self-sorts of the corresponding groups of subjects. In all instances, strong evidence was obtained for the existence of significant individual differences or subpopulations.

Very significant high linear relationships were found between the ideal-concepts of the subjects constituting the total group, the boys' group, and the girls' group, and the corresponding group ideals. This suggests a uniformly strong tendency for the ideal-concept of an adolescent to conform with the ideal-concept of the group of which he is a member. Again, evidence of the existence of significant individual differences in the ideal - group ideal relationship was obtained.

The influence of the group ideal-concepts of the boys' and girls' groups on their self-ideal relationships was examined by partial correlative analysis. It was observed that by holding the group ideal constant, a lowering of the self-ideal relationship resulted. It is difficult to isolate the precise area where this influence is greatest. It may reflect the group's influence on the expressed concept of self; that is, it may reflect a conscious tendency of the individual to describe himself with a bias in the direction of what the group considers desirable. On the other hand, it may reflect the influence of the group ideal on his own ideal-concept. It is probably caused, to a greater or less extent, by both of these effects.

The subjects of the study were classified as possessing high, medium or low self-acceptance, group-acceptance or social integration according as their self ideal, self - group ideal or ideal - group ideal correlations fell respectively above, within or below one standard deviation of the corresponding mean correlation. These cross classifications were analyzed by means of contingency tables. In this manner,

it was found that there is a strong tendency for subjects who exhibit a high self-ideal relationship also to exhibit a high self - group ideal relationship, and conversely. Similarly, a significant positive direct variation was found between the self-ideal relationship and the ideal - group ideal relationship. On the other hand, no such tendency was observed for the self - group ideal and ideal - group ideal relationships. This negative result may be interpreted as indicating that adolescents whose self-concepts resemble the group ideal for their sex, do not necessarily have ideal-concepts which resemble this group ideal.

III. GROUP DISSATISFACTION AND CONCERN

The terms "dissatisfaction" and "concern" were defined mathematically in relation to the present investigation. "Dissatisfaction" refers to the discrepancy between the self and ideal conceptions of some aspect of the physical or mental being. "Concern" is related to the degree of indifference an individual displays toward some such aspect.

For the group as a whole, no significant differences were found in the concern felt for the various areas of the perceived self. Similarly, no significant intra-sex differences in concern for these areas were observed, although there appeared to be a slight tendency for the girls to be more concerned with the area of "Mental Processes" than with that of "Bodily Processes". The limited coverage of these areas, and the obscuring influence of the averaging process, make this apparent uniformity of "concern" of doubtful significance. The subject

of "concern with the various areas of self-perception" would seem to offer possibilities for more intensive research.

Analysis of the intra-sex differences in "dissatisfaction with the areas of the perceived self" showed that the girls were significantly more dissatisfied with the area of "Mind" than with "Mental Processes" or "Bodily Processes". No significant differences in the dissatisfactions associated with the various areas of self-perception were found for the boys. Again, more intensive investigation may yield significant differences in these areas.

IV. SEX DIFFERENCES

The boys' and girls' mean self-ideal, self - group ideal and ideal - group ideal correlations were examined for significant sex differences. Although no significant differences were found, further analysis showed a significant tendency for a larger proportion of girls, than of boys, to have self-ideal correlations which exceeded their self - group ideal correlations, and a larger proportion of boys, than of girls, to have self - group ideal correlations which exceeded their self-ideal correlations. This may be interpreted to mean that, in adolescence, there is a tendency for a larger proportion of girls, than of boys, to have self-concepts which conform more with their own ideal-concepts than with the group ideal for their sex, and for a higher proportion of boys, than of girls, to have self-concepts which conform more with the group ideal for their sex than with their own ideal-concepts.

Analysis of the percentages of boys and girls in the high and low self-acceptance, group-acceptance and social integration groups, as they were defined in this study, showed no significant sex differences, except in the "high social integration group", where a significantly higher percentage of girls, than of boys, were found to have a high degree of conformity between their ideal-concepts and the corresponding group ideal.

No significant sex differences in "concern" for the various areas of self-perception were found. There did appear to be a slight tendency for girls, more than boys, to be concerned with the general "Mental" area of self-perception, and for boys, more than girls, to be concerned with the "Physical" aspects of the self. This apparent tendency could probably be confirmed or rejected by further investigation.

The group dissatisfactions associated with the various areas of the perceived self were investigated for significant sex differences. Although none were found, there seemed to be a consistent tendency for girls, more than boys, to be dissatisfied with all of the areas of self-perception. Again, this tendency could be the subject of further research.

Little intensive analysis was applied to determine the significance of sex differences in the group ideals of the boys and girls. The very significant high correlation found between the boys' and girls' group ideal-sorts suggests that any such differences would be small.

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APPENDIX I

SUMMARY AND CLASSIFICATION OF THE SELF-DESCRIPTIVE STATEMENTS

The following table classifies each of the self-descriptive statements by its letter combination which locates the statement in the theory in the manner described in Chapter IV. It also gives the statement numbers which denote the order in which the statements were presented to the subjects.

TABLE XXIV SUMMARY AND CLASSIFICATION OF THE SELF-DESCRIPTIVE STATEMENTS

Letter Combination	Statement Number	Statement
acf	8	I feel good about my honesty.
	32	I feel happy about knowing right from wrong.
adf	14	I am as ambitious as most people.
	36	I have as much self-control as most people.
aef	18	I have a good temper.
	22	I don't get discouraged easily.
	42	I am usually happy.
acg	26	I feel satisfied with my mind.
	40	I feel satisfied with my vocabulary.
adg	3	I am as smart as most people.
	46	I have more than average common sense.

TABLE XXIV (CONTINUED)

Letter Combination	Statement Number	Statement
aeg	12	I have a good sense of humour.
	50	I think clearly.
ach	20	I feel happy about my strength.
	48	I feel satisfied with my eyesight.
adh	6	I am as good at sports as most people.
	30	I am better than average at mechanical work.
aeh	16	I have a good appetite.
	34	I have a strong heart.
aci	10	I feel happy about my weight.
	44	I feel satisfied with my build.
adi	24	I have as good posture as most people.
	38	I am as clean and neat as most people.
aei	1	I am good-looking.
	28	I have good teeth.
bcf	23	I am often unhappy because I am lonely.
	37	I often feel unhappy because I think bad thoughts.
bdf	9	I have fewer interests than most people.
	49	I daydream more than most people.

TABLE XXIV (CONTINUED)

Letter Combination	Statement Number	Statement
bef	4	My feelings are easily hurt.
	13	I am usually nervous.
	27	I get embarrassed easily.
	43	I feel like smashing things sometimes.
bcg	17	I am often unhappy because I can't understand my teachers.
	35	I worry about my memory.
bdg	21	I can't concentrate as well as most pupils.
	41	I don't understand books as well as most pupils.
beg	7	I am slow at arithmetic.
	31	I have a hard time solving problems.
bch	2	I worry about my health.
	45	I worry about my voice.
bdh	11	I am clumsier than most people.
	51	I have to be more careful than most people about what I eat.
beh	25	I am hard of hearing.
	39	I sometimes have trouble breathing.
bci	5	I worry about my weight.
	29	I worry about my hands.

TABLE XXIV (CONTINUED)

Letter Combination	Statement Number	Statement
bdi	15	I am not as well-developed as most people.
	33	My hair is not as nice as most peoples'.
bei	19	I have poor skin.
	47	My eyes are small.

APPENDIX II

NORMALIZATION OF THE DISTRIBUTION OF SELF-DESCRIPTIVE STATEMENTS

In determining the frequency distribution of the 51 self-descriptive statements into eleven "truth categories", it was necessary to fulfill the following conditions:

1. The resulting frequency distribution should be the best normal approximation for a sample of size 51;
2. Truth categories "0" and "10" must contain one statement;
3. The widths of the class intervals corresponding to the truth categories must be equal.

The first two conditions require that,

$$\int_{-\infty}^{a} \frac{1}{\sqrt{2\pi}} e^{-t^2/2}\, dt = \int_{b}^{\infty} \frac{1}{\sqrt{2\pi}} e^{-t^2/2}\, dt = \frac{1}{51} = 0.0196 \quad \ldots(1),$$

where "a" and "b" are points on a theoretically infinite truth continuum; "a" being the limiting point of the interval corresponding to truth category "0" nearest to the origin of the continuum, and "b" being the corresponding point of the interval corresponding to truth category "10". Equations (1) are easily solved by tables for the Cumulative Normal Distribution.[1] These give, a = -2.061, and b = +2.061. The interval between "a" and "b" is, therefore, of width 4.122. By the third condition this interval must be divided into nine subintervals of equal width corresponding to truth categories "1" to "9". It follows that the widths of each of these intervals will be 0.458. The origin of the

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1. A.M. Mood. Introduction to the Theory of Statistics, McGraw-Hill Book Company, Inc., New York, 1950, p.423.

continuum will be located at the centre of the subinterval corresponding to truth category "5". When the end-points of all of the subintervals have been determined, the areas under the normal curve, between ordinates to the curve at these end-points, can be found from tables for the Cumulative Normal Distribution. These areas will determine the theoretical frequencies of statements in the corresponding truth categories. The actual number of statements in each of the truth categories is then found by multiplying each of the theoretical frequencies by 51, and rounding off the products to the nearest whole number.

The results of the computations involved in the procedure described above are given in the following table.

TABLE XXV RESULTS OF THE COMPUTATIONS INVOLVED IN NORMALIZING THE DISTRIBUTION OF SELF-DESCRIPTIVE STATEMENTS

Truth Category Number	0	1	2	3	4	5
Class Interval	$-\infty$ to -2.061	-2.061 to -1.603	-1.603 to -1.145	-1.145 to -0.687	-0.687 to -0.229	-0.229 to 0.229
Relative Frequency	0.0196	0.0351	0.0703	0.1200	0.1639	0.1820
Number of Statements	1	2	4	6	8	9

TABLE XXV (continued)

Truth Category Number	6	7	8	9	10
Class Interval	0.229 to 0.687	0.687 to 1.145	1.145 to 1.603	1.603 to 2.061	2.061 to ∞
Relative Frequency	0.1639	0.1200	0.0703	0.0351	0.0196
Number of Statements	8	6	4	2	1

Figure 6 shows the discrete distribution of the statements and the normal curve to which it was fitted. The extreme bars of the histogram have been adjusted to make their widths equal to those of the other bars, in conformity with Condition 3. The figures on the bars of the histogram correspond to the number of statements in the truth categories. The direction of increasing truth is from left to right.

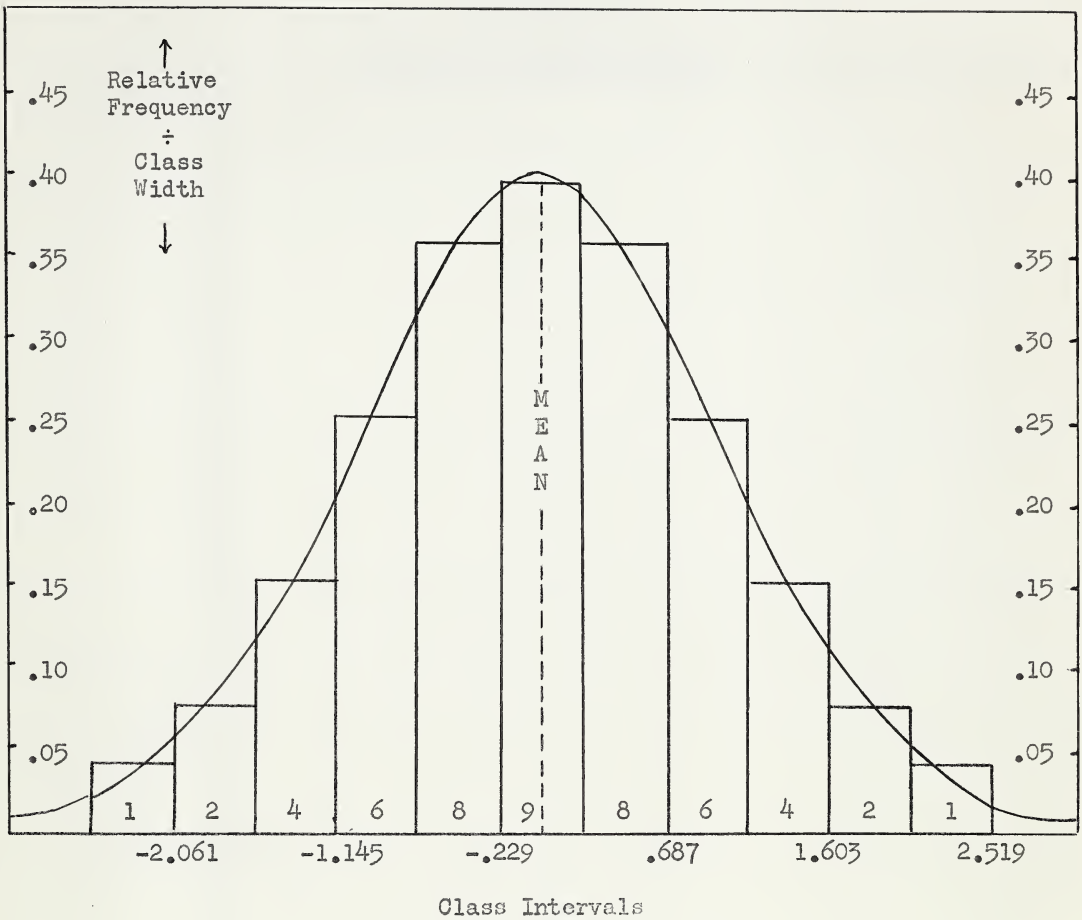
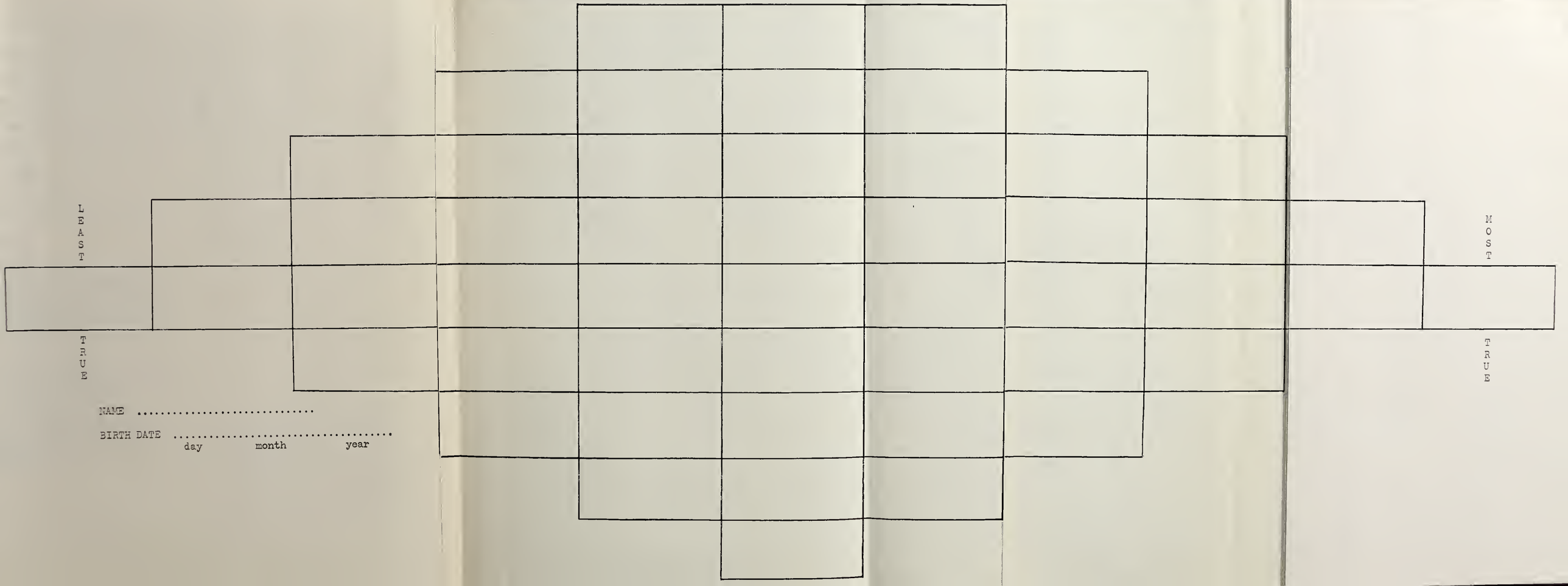


Figure 6. Histogram Showing the Relative Frequency Distribution of Self-Descriptive Statements into Eleven Truth Categories, and Best Fitting Normal Curve.

The vertical scale numbers are adjusted to make the areas of the histogram bars equal to the relative frequencies.

APPENDIX III

SAMPLE DISTRIBUTION CHART



NAME .....

BIRTH DATE .....
day month year

APPENDIX IV

INSTRUCTIONS FOR THE ADMINISTRATION OF THE FORCED-SORT

In the following instructions, the column on the left contains the procedure to be followed by the test administrator, and the column on the right contains the verbal instructions to be given to the subjects. The sample cards referred to in Paragraph 1 of the Procedure were used to illustrate the way in which the cards were to be sorted. The letter designations of these cards, and the statements printed on them, are given below.

A. I am tall.
B. I don't like football.
C. I am a good swimmer.
D. I speak French well.

PROCEDURE	INSTRUCTIONS
1. Before the students have entered the room, the distribution charts should be placed face-up on the desks. The four trial cards should be piled in order (A,B,C,D) directly under the "Most True" label.	
2. When the students have taken their places, they should be instructed to await verbal instructions before proceeding.	
3. The adjacent introductory comments should be read to the students before the sort is commenced.	"One thing that makes people so interesting is that they are all different in some ways. We are all better at some things than at others. We all have our faults and we all have virtues. All of us have problems. The problems and feelings we have when we are

PROCEDURE	INSTRUCTIONS
	becoming men and women are very important to us, partly because we are not yet used to them, and partly because we don't know what to do about them. Your parents and teachers have all passed through the growing-up period, but it is hard for them to remember exactly how young people feel about things, and exactly what their problems are. If parents and teachers are to help and understand young people during this growing-up period, it is vital that they know what you think and feel about yourselves as you are now, and as you would like to be. YOU are the ones who really know! The aim of this survey is to obtain information to help YOU! Do not be afraid to be truthful; the information you give will be considered as completely confidential."
	SELF-SORT
4. During the reading of the adjacent instructions, it is suggested that the instructor hold a distribution chart in front of him and use it to illustrate the instructions.	"Look at the chart in front of you. You will see that there are eleven columns." (Instructor points to them.) "The first columns on the right and left have only one space each." (Points) "The second column in from the left and from the right each has two spaces." (Points.) "The centre column has nine spaces." (Points). "Altogether there are fifty-one spaces on the chart. In a moment you will be given fifty-one cards to place in these spaces. This is how to place the cards:

PROCEDURE	INSTRUCTIONS
	If the statement on the card is quite true for you, place the card in one of the columns toward the right.
	If you feel that the statement on the card is not very true for you, place it in one of the columns toward the left.
Instructor points to the word "Most" in the "Most True" label.	The statement you feel is most true of you goes in the space directly under the word 'Most'.
Instructor points to the word "Least" in the "Least True" label.	The statement you feel is least true of you goes in the space directly under the word 'Least'.
	Statements which don't seem to be particularly 'true' or 'not true' should go in the centre column or in one of the columns near the centre.
Instructor should point to a central column and to the spaces in it.	Once you have decided on a column, it doesn't matter what space in the column you put the statement in.
Instructor points to the right and left as he gives the instructions.	You may rearrange the statements on the chart as you go along. Remember, you keep the 'true' statements toward the right and the 'not true' statements toward the left."
5. It is recommended that during the reading of the adjacent instructions, the instructor walk down the centre aisle and check on a few of the students to see that they are following the procedure.	"Now pick up the sample cards under the label 'Most True'. Card A says, 'I am tall'. Ask yourself if this is true for you. If it is very true, place the card in one of the columns well over to the right. If it is not true, place the card in one of the columns on the left. If you are of medium height, place the card at or near the centre of the chart.

PROCEDURE '	INSTRUCTIONS
	Do the same for each of the other cards, asking yourself each time if the statement is true for YOU.
In giving individual assistance, the instructor is free to use whatever comments he feels are necessary to clarify the procedure.	If you have any questions, put up your hand."
6. Sufficient time should be allowed for the students to place all of the sample cards. When the instructor is satisfied that the procedure is understood, he should say -	"Now pick up the sample cards, place them at the top of your desk, and wait for further instructions."
7. The instructor distributes one set of statements to each student, and then says -	"Before you place these cards, be sure to ask yourself if the statement is true for YOU. Take the cards in the order in which you find them. You may rearrange the cards on the chart as you go along. Every space on the chart must be covered with just one card. You have twenty minutes. GO AHEAD!"
8. At the end of about two minutes, the instructor should say -	"Remember, the truer a statement is, the further it goes to the right; the more untrue it is, the further it goes to the left."
9. At the end of fifteen minutes, the instructor should say -	"You have five more minutes."
10. At the end of twenty minutes, the instructor should say -	"Leave the cards as they are now. Be careful not to spill them. Start at the left, picking up the cards one at a time and writing the card number in pencil on the chart space beneath."

PROCEDURE	INSTRUCTIONS
11. When all of the card numbers are recorded, the instructor should say -	"Place the rubber band around the cards. Write your name and birth date in the proper spaces in the bottom left-hand corner of the chart. After your name, print 'B' if you are a boy, and 'G' if you are a girl. Place the bundle of cards and the sample cards on the chart, and leave them on your desk."

IDEAL-SORT

12. Procedures 1 and 2 should be repeated with the exception that the trial cards need not be set out.	
13. The adjacent introductory comments should be read to the students before the sort is commenced.	"Today you are going to sort cards again. You will remember that last time you sorted the cards so that the statements which were really true of you were placed toward the right of the chart. The statements which were not really very true of you were placed toward the left of the chart. Today you are to imagine that you are the person you would MOST like to be. Keep firmly in mind that you are to sort the cards as the person you would most like to be, and not as you really are. Otherwise the procedure is just the same as before."
14. During the reading of the adjacent instructions, it is suggested that the instructor hold a distribution chart in front of him and use it to illustrate the instructions.	"If the statement on the card is true of the person you would most like to be, place the card in one of the columns toward the right. If the statement on the card is not true of the person you would most like to be, place the card in one of the columns toward the left."

PROCEDURE	INSTRUCTIONS
15. The instructor distributes one set of statements to each student. He should then say -	"Before you place each of these cards, be sure to ask yourself if the statement is true of the person you would most like to be. Take the cards in the order you find them. You may rearrange the cards ON THE CHART as you go along. Every space on the chart must be covered by just one card. You have twenty minutes. GO AHEAD!"
16. At the end of two minutes, the instructor should say -	"Remember, the truer a statement is for the person you would most like to be, the further it goes to the right; the more untrue it is for the person you would most like to be, the further it goes to the left."
17. At the end of fifteen minutes, the instructor should say -	"You have five more minutes."
18. At the end of twenty minutes, the instructor should say -	"Leave the cards as they are now. Be careful not to spill them. Start at the left, picking up the cards one at a time, and writing the card number in pencil on the chart space underneath."
19. When all of the numbers are recorded, the instructor should say -	"Place the rubber band around the cards. Write your name and birth date in the proper spaces in the bottom left-hand corner of the chart. After your name, print 'B' if you are a boy, and 'G' if you are a girl. Place the bundle of cards on the chart and leave them on your desk."

APPENDIX V

SUMMARY OF THE RAW DATA

TABLE XXVI IDENTIFICATION DATA OF SUBJECTS, AND TRUTH CATEGORY NUMBERS CORRESPONDING TO THE POSITIONS OF THE SELF-DESCRIPTIVE STATEMENTS ON THE DISTRIBUTION CHARTS FOR THE SELF AND IDEAL-SORTS

Statement Numbers

Subject Number	Sex	Age	SORT*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	F	15-1	I	6	3	8	2	4	9	3	10	1	8	2	8	3	7	2
			S	3	8	6	4	6	6	10	7	5	9	4	7	5	5	3
2	F	14-6	I	9	3	7	3	3	6	2	8	4	7	4	8	2	8	3
			S	2	3	7	4	6	6	5	10	3	5	2	9	4	6	3
3	F	15-5	I	10	5	9	1	2	9	2	8	2	3	4	8	1	8	5
			S	6	3	6	3	6	10	7	6	8	4	4	8	6	6	7
4	F	15-5	I	9	5	9	3	5	8	3	7	5	5	1	10	1	8	0
			S	5	4	2	6	5	9	10	7	7	8	1	7	9	5	4
5	F	16-0	I	10	1	9	1	2	7	2	8	2	7	2	9	3	8	6
			S	2	4	6	1	6	9	8	8	4	6	1	5	3	8	2
6	F	13-10	I	9	2	5	5	3	7	4	6	3	3	2	8	2	8	9
			S	7	3	2	5	4	7	5	5	1	4	5	6	4	8	1
7	F	14-11	I	9	5	9	1	4	8	2	8	2	6	4	8	3	7	3
			S	5	5	6	5	6	5	4	8	4	4	4	6	6	6	4
8	F	14-8	I	9	1	7	3	2	10	2	7	2	7	3	9	3	7	8
			S	5	1	5	3	2	9	10	8	2	7	2	6	1	7	5
9	F	15-1	I	10	0	9	1	2	8	2	9	1	8	2	8	2	7	4
			S	6	4	6	3	3	6	5	7	7	7	1	6	7	8	2
10	F	14-5	I	9	1	9	2	2	8	2	8	2	5	6	8	3	7	3
			S	5	2	10	4	1	5	2	6	3	5	5	8	1	8	4
11	F	14-7	I	10	2	9	2	0	9	1	8	2	6	1	8	2	8	3
			S	4	0	2	4	1	10	5	6	2	5	3	5	1	8	4
12	F	14-11	I	9	4	8	3	4	7	3	9	2	7	2	8	4	8	3
			S	5	1	6	2	3	6	3	8	5	5	2	8	4	8	3
13	F	14-7	I	9	1	8	2	1	8	0	10	3	9	2	8	2	7	3
			S	7	3	7	8	8	3	10	6	4	1	5	9	4	6	4
14	F	15-6	I	10	3	6	1	5	9	5	6	3	6	1	9	4	4	5
			S	5	6	5	3	8	10	8	7	5	6	3	8	6	7	1

Subject Number	Sex	Age	SORT*	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
1	F	15-1	I	6	5	6	2	7	3	7	1	8	0	7	3	9	3	4	4	7	4	7	4	6	4
			S	5	0	5	5	6	6	7	1	7	4	3	4	8	4	2	8	7	2	6	5	4	3
2	F	14-6	I	5	1	5	0	7	4	9	1	8	4	7	4	7	4	7	4	5	3	6	3	6	5
			S	8	2	5	8	7	4	8	8	7	6	7	4	5	1	2	3	7	5	6	0	3	4
3	F	15-5	I	5	2	6	3	7	3	5	3	7	3	7	4	7	5	5	4	7	4	5	5	7	4
			S	8	7	4	2	5	3	7	1	9	2	4	1	3	2	2	4	7	5	4	5	8	0
4	F	15-5	I	6	2	2	2	7	2	4	3	7	3	6	3	6	3	8	4	6	4	6	4	7	5
			S	2	3	6	7	8	6	3	5	6	7	8	7	6	5	4	2	5	6	4	3	3	4
5	F	16-0	I	3	0	8	3	7	3	7	3	6	4	7	4	7	5	8	5	6	5	5	5	5	4
			S	5	0	10	2	7	6	6	2	5	3	6	4	7	8	4	5	7	4	5	3	7	3
6	F	13-10	I	6	2	6	1	3	4	7	0	8	3	5	4	5	5	3	5	7	1	5	5	7	4
			S	6	5	7	3	3	5	6	0	7	3	6	6	9	4	2	6	8	3	7	4	8	2
7	F	14-11	I	5	3	5	3	5	4	5	3	7	0	7	2	8	5	7	4	7	3	6	4	6	4
			S	5	3	5	3	5	3	7	3	7	0	8	6	9	4	5	6	7	3	7	4	8	2
8	F	14-8	I	6	3	5	2	6	3	3	4	6	5	6	4	6	4	4	4	6	8	5	4	8	1
			S	8	7	7	2	5	4	4	3	7	5	4	7	6	6	3	3	6	5	8	3	6	5
9	F	15-1	I	8	3	7	3	7	3	7	3	7	3	7	4	6	5	5	4	6	4	6	4	5	4
			S	9	4	6	4	7	5	5	5	8	2	8	4	10	3	4	5	9	3	4	0	6	5
10	F	14-5	I	5	3	6	3	5	3	3	4	7	4	6	4	7	4	5	1	7	5	6	4	6	4
			S	7	2	7	6	3	3	3	3	7	4	8	4	3	2	4	4	5	6	6	6	7	4
11	F	14-7	I	6	3	6	3	5	3	7	3	7	3	7	4	8	4	5	4	7	4	7	4	7	4
			S	8	6	7	5	7	3	7	4	7	3	6	6	8	5	5	9	6	7	8	2	6	5
12	F	14-11	I	7	1	5	5	6	3	8	2	6	1	7	4	6	5	5	4	7	3	6	5	6	3
			S	8	1	7	5	4	3	7	2	6	0	9	6	6	3	4	5	9	4	7	4	6	4
13	F	14-7	I	6	3	3	3	3	2	6	4	6	4	4	4	6	5	4	4	7	4	7	5	6	5
			S	7	2	4	6	3	6	7	4	6	3	5	9	6	4	1	5	5	5	5	5	6	3
14	F	15-6	I	6	5	7	2	2	4	5	5	4	4	7	4	6	2	5	0	6	2	6	5	7	5
			S	6	5	7	7	4	6	6	4	6	5	3	1	4	2	4	5	4	3	8	0	3	4

Subject Number	Sex	Age	SORT*	38	39	40	41	42	43	44	45	46	47	48	49	50	51
1	F	15-1	I	6	4	6	5	6	6	5	5	5	5	5	4	5	5
			S	6	4	2	4	5	6	7	5	3	3	9	2	1	8
2	F	14-6	I	6	4	5	5	6	2	6	5	6	5	10	5	6	2
			S	6	1	6	4	9	5	4	4	6	5	3	5	7	5
3	F	15-5	I	8	5	6	4	6	6	6	4	6	4	6	0	6	3
			S	9	3	4	5	7	5	4	6	5	5	5	3	6	5
4	F	15-5	I	7	4	7	6	8	4	6	5	5	5	4	4	6	5
			S	6	4	0	4	6	2	3	5	4	5	8	1	3	5
5	F	16-0	I	4	4	6	4	6	6	6	4	6	3	5	4	5	5
			S	6	3	5	4	7	9	7	3	6	4	5	4	5	5
6	F	13-10	I	7	4	6	4	10	4	8	6	6	6	6	4	7	5
			S	8	6	5	5	10	4	9	4	4	3	6	5	7	2
7	F	14-11	I	6	4	6	4	10	1	6	5	6	5	7	2	6	5
			S	9	1	7	2	10	2	5	4	8	6	1	2	7	3
8	F	14-8	I	8	5	5	5	7	4	6	5	6	5	7	4	5	0
			S	9	3	4	6	8	4	6	4	5	4	4	5	6	0
9	F	15-1	I	5	4	6	4	6	5	6	5	6	5	6	3	5	5
			S	6	7	2	5	6	4	8	1	5	2	3	4	5	3
10	F	14-5	I	6	4	7	4	8	0	6	5	6	5	7	5	10	5
			S	8	5	6	6	9	0	5	6	7	5	9	5	7	4
11	F	14-7	I	6	4	6	4	6	5	6	5	5	5	5	5	6	5
			S	7	3	6	2	9	4	6	4	4	5	5	3	4	3
12	F	14-11	I	7	4	5	4	10	0	6	5	5	5	6	2	6	4
			S	7	3	7	5	7	2	5	5	6	5	10	4	6	4
13	F	14-7	I	6	5	4	5	8	5	7	5	6	5	7	6	7	5
			S	8	5	8	0	6	2	2	3	4	7	2	5	4	7
14	F	15-6	I	8	4	7	3	8	8	8	3	4	3	6	7	7	3
			S	4	2	7	5	6	9	2	2	5	3	4	7	5	9

TABLE XXVI (continued)

Subject Number	Sex	Age	SORT*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
15	F	15-4	I	10	3	7	0	5	9	3	8	5	8	2	9	2	8	2	5	5	8	4	5	3	7	3	6	4	7	1	7	4	5	4	6	1	4	4	7	4	7	4	6	5	6	2	6	5	6	3	5	3	6	6
			S	6	3	5	7	9	4	8	7	2	0	5	10	2	4	5	8	6	1	4	6	5	4	3	4	5	5	6	9	2	5	6	6	8	7	7	7	4	6	2	8	4	7	4	3	1	5	3	5	3	6	3
16	F	14-6	I	10	3	8	0	4	8	3	8	5	6	2	8	5	7	3	7	3	7	3	6	2	7	4	6	4	9	2	6	5	5	4	7	4	6	4	7	1	6	4	6	1	8	2	6	5	5	5	5	4	5	3
			S	5	1	9	3	7	6	2	7	3	9	3	6	4	8	5	6	4	7	3	5	5	6	4	5	0	10	4	7	4	5	3	6	4	8	5	8	3	6	2	7	2	7	1	4	5	6	6	5	4	8	2
17	F	15-11	I	8	4	10	1	7	6	5	7	2	5	2	9	4	8	3	3	3	3	3	5	4	4	4	6	2	6	4	6	2	7	1	6	0	4	5	8	5	8	5	9	6	7	5	7	6	7	3	4	5	6	5
			S	5	2	5	8	5	5	5	10	3	5	2	6	7	6	3	6	6	4	2	4	6	7	1	8	3	5	4	6	9	7	4	7	4	8	3	9	5	7	3	4	1	8	4	7	5	4	3	2	0	6	6
18	F	16-10	I	8	5	7	2	3	7	2	8	3	5	6	6	2	7	7	3	4	9	3	6	7	3	2	6	1	8	4	5	4	5	4	5	5	5	4	5	4	6	0	6	6	10	1	6	4	7	4	8	3	9	5
			S	3	3	7	6	4	4	4	6	2	6	3	7	1	6	5	8	2	6	2	9	3	4	6	8	1	5	8	6	2	4	5	6	5	7	4	5	0	7	3	3	5	8	4	5	4	5	7	10	5	9	7
19	F	16-5	I	6	0	6	2	2	6	3	7	3	8	3	6	3	8	3	5	3	5	4	6	7	4	5	7	2	8	4	7	1	6	1	6	4	10	2	5	4	8	4	7	5	7	4	5	4	9	5	6	5	9	5
			S	5	2	5	3	2	4	2	7	4	6	3	5	0	8	7	5	3	6	4	5	3	6	6	8	1	10	6	9	1	5	5	8	4	7	4	7	6	8	3	6	4	9	4	6	4	7	5	3	2	7	5
20	F	15-11	I	7	0	7	1	5	8	2	8	3	6	1	9	2	7	6	5	3	7	2	5	3	3	2	6	3	8	3	9	4	4	4	6	4	6	5	6	4	8	4	7	4	7	4	5	6	10	5	5	5	5	6
			S	3	4	4	6	5	5	6	6	6	4	3	7	8	6	3	5	5	10	4	5	7	8	1	8	2	7	7	7	8	1	7	9	2	6	2	6	2	6	3	5	5	9	3	5	3	4	4	0	4	5	4
21	F	15-7	I	8	8	7	6	6	5	0	8	4	8	4	6	4	6	4	7	2	5	2	3	3	6	4	7	4	9	5	7	1	5	5	6	2	10	5	7	2	6	4	9	3	4	3	6	7	5	3	5	3	5	1
			S	5	7	6	5	8	9	5	8	2	1	3	8	7	7	2	7	6	8	2	7	1	9	4	6	2	5	7	3	3	5	4	10	3	6	5	6	3	5	4	6	4	0	4	5	4	5	4	6	3	6	4
22	F	16-2	I	6	0	10	1	2	7	1	6	2	5	2	7	2	6	6	4	4	5	4	5	6	4	3	6	3	5	3	6	3	5	4	7	3	7	4	7	3	7	4	8	8	8	4	8	5	9	5	5	5	9	6
			S	0	1	10	9	9	8	8	1	2	8	8	2	7	2	2	7	7	3	3	3	7	3	7	5	3	4	7	4	6	4	6	5	6	4	4	6	6	6	4	4	5	5	6	3	5	5	5	5	4	5	6
23	F	15-7	I	5	3	5	3	7	7	2	4	3	5	5	6	4	6	4	2	5	7	4	3	5	8	4	5	5	6	4	8	6	7	2	8	2	6	3	7	3	6	1	6	0	6	4	7	8	9	4	5	1	10	9
			S	1	5	6	5	5	3	3	10	7	4	5	6	3	8	3	7	3	8	2	2	2	8	5	6	5	6	6	1	5	0	4	7	7	7	2	6	4	9	7	8	4	9	3	5	4	6	4	6	4	4	5
24	F	16-9	I	10	1	9	3	2	8	5	8	3	8	4	8	2	9	2	5	3	7	1	7	5	7	0	7	3	7	5	6	3	6	4	6	4	6	5	6	4	6	4	6	4	6	5	7	4	5	3	5	4	5	2
			S	5	5	5	5	9	7	6	8	1	8	1	8	4	8	2	10	2	7	5	7	2	4	0	7	2	6	5	7	4	3	5	7	4	6	5	6	3	6	3	3	4	6	4	4	4	6	3	9	3	5	6
25	F	15-1	I	10	4	4	1	3	6	4	6	3	6	5	7	2	8	3	0	2	6	1	2	5	6	4	7	2	5	6	7	4	6	5	5	3	7	5	7	5	5	3	8	4	9	6	9	3	7	5	8	4	8	4
			S	0	4	8	9	6	9	7	6	4	1	5	7	3	6	2	10	2	3	4	4	3	5	3	8	1	4	7	6	4	3	6	5	2	7	4	6	4	8	3	5	6	7	8	6	5	5	7	2	5	5	5
26	F	16-0	I	10	2	6	0	3	8	3	8	3	5	2	7	3	8	3	7	4	7	2	7	4	7	4	5	2	7	1	9	4	6	4	6	4	6	4	6	1	6	4	6	5	9	5	8	5	5	5	6	5	5	3
			S	8	1	6	6	3	10	5	6	5	7	5	6	4	6	5	8	5	6	3	7	5	7	6	7	1	3	4	5	3	5	4	6	4	8	2	3	3	7	2	4	4	8	2	7	2	9	4	0	5	9	4
27	F	15-0	I	10	2	6	4	1	7	0	8	4	9	3	7	3	6	3	6	4	7	5	5	4	9	3	8	1	6	4	6	3	7	3	6	2	8	4	7	5	7	4	6	5	6	4	5	2	8	5	5	5	5	2
			S	5	3	5	3	4	10	4	5	4	6	2	5	3	7	7	7	4	8	2	5	6	6	3	9	1	5	4	7	2	3	6	6	5	5	4	6	1	8	4	5	6	8	6	7	2	4	8	9	3	7	0
28	F	16-7	I	9	5	6	5	3	7	5	9	5	5	4	7	7	8	6	6	3	4	1	5	1	6	4	6	0	10	4	7	4	5	2	5	5	6	3	6	4	8	2	8	7	7	3	2	3	6	4	4	3	8	2
			S	5	8	7	8	0	6	6	8	3	5	2	7	7	6	5	7	8	5	4	4	3	4	3	5	10	6	2	6	2	1	3	6	3	5	2	5	1	5	4	4	4	7	4	6	4	5	6	9	3	8	7
29	F	15-9	I	10	3	9	2	2	9	2	8	2	7	3	8	3	8	3	5	4	1	1	5	3	6	3	7	4	7	0	7	4	5	7	7	4	6	4	6	4	8	4	6	4	6	5	5	5	6	5	6	5	6	5
			S	5	4	7	6	4	9	5	7	3	8	3	7	3	8	3	6	3	8	5	7	5	7	2	5	2	6	8	6	4	3	6	6	2	6	1	4	4	9	4	5	4	10	5	4	5	6	2	7	0	5	1
30	F	16-0	I	10	3	9	2	2	9	2	8	2	8	3	8	3	8	3	5	4	1	4	6	6	7	3	7	3	6	1	7	4	5	4	5	4	6	4	7	5	7	6	5	5	6	4	7	4	0	5	6	5	6	5
			S	5	4	5	4	6	7	5	6	3	5	1	6	4	6	2	5	7	9	5	6	7	3	3	6	0	7	5	4	2	2	4	5	7	8	3	6	3	10	4	2	6	7	4	5	1	8	4	8	3	8	9
31	F	15-1	I	8	4	4	4	2	6	3	7	0	6	1	7	5	6	4	7	5	5	3	8	5	7	5	6	4	4	3	9	3	7	2	9	3	6	4	8	5	10	1	5	6	8	2	6	3	5	5	7	2	6	4
			S	5	1	5	5	2	6	4	7	6	8	4	6	2	8	2	7	3	7	7	5	4	5	4	4	3	6	7	9	3	0	3	6	6	9	5	7	6	10	4	5	3	5	1	8	3	6	4	8	4	5	2
32	F	15-8	I	9	5	8	10	8	5	8	7	5	6	2	8	3	7	3	7	0	6	3	6	2	5	4	7	4	6	5	7	4	3	4	4	1	7	1	3	2	6	5	6	5	6	3	2	4	5	5	6	4	4	9
			S	5	2	7	7	6	3	6	7	1	5	2	8	3	6	5	6	4	6	0	5	1	7	2	5	3	5	9	7	2	4	6	8	3	5	4	5	3	10	4	6	4	8	4	4	3	5	7	9	4	6	8
33	F	15-11	I	9	4	10	2	3	7	2	5	4	8	3	9	5	8	5	7	4	5	1	5	7	6	1	5	3	6	4	6	2	5	4	7	6	7	3	5	2	8	0	8	6	4	4	6	5	6	3	7	4	6	3
			S	5	2	7	7	3	6	7	6	6	1	2	9	9	5	4	8	3	5	0	5	4	5	2	7	1	5	4	8	5	4	10	8	3	8	3	5	3	6	3	6	4	7	4	6	4	6	4	6	5	7	2

TABLE XXVI (Continued)

Subject Number	Sex	Age	SORT*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
34	F	15-3	I	7	0	7	1	1	6	2	7	2	6	2	7	2	6	10	6	3	6	3	5	3	5	3	8	3	5	4	9	4	4	4	8	4	6	4	8	5	7	5	8	5	5	4	5	5	6	4	7	6	9	3
			S	5	6	9	3	6	9	4	7	5	4	2	8	5	5	4	7	4	5	5	4	1	7	2	7	0	6	3	8	5	3	5	6	10	5	3	6	4	6	2	6	1	8	2	6	4	7	3	3	8	7	4
35	F	15-9	I	10	5	9	4	1	8	4	7	4	5	3	7	4	6	4	7	4	8	3	8	2	6	5	5	3	7	0	6	3	6	1	6	4	6	5	7	4	8	2	5	3	7	6	5	2	9	5	5	2	6	3
			S	5	1	6	4	5	6	4	6	4	0	3	8	6	8	3	7	4	1	2	5	3	6	2	7	2	7	7	6	4	3	3	9	4	5	4	5	3	7	5	4	2	10	8	6	6	7	5	8	5	9	5
36	F	16-10	I	10	1	9	6	2	8	2	4	3	6	5	6	4	7	2	6	5	3	5	5	3	7	3	7	4	5	3	9	3	4	1	8	4	8	5	7	4	6	0	6	5	7	4	8	5	6	2	5	4	7	6
			S	1	9	8	8	2	2	8	8	4	7	2	7	7	4	4	4	3	3	0	3	1	4	7	7	4	3	3	2	6	3	9	7	5	5	4	6	4	6	10	6	6	6	5	5	6	5	5	5	5	6	5
37	F	15-6	I	8	4	8	2	3	8	1	8	2	7	3	9	5	7	2	5	3	3	3	6	3	4	4	7	4	7	4	6	5	6	4	5	4	7	5	6	5	7	4	6	5	10	0	6	5	9	5	6	1	6	2
			S	4	2	6	4	7	9	8	9	1	5	3	10	3	6	1	7	4	8	6	4	7	6	2	7	0	5	5	4	3	3	6	5	2	8	3	7	4	8	4	6	5	7	5	4	3	6	5	5	2	6	5
38	F	15-11	I	5	2	9	2	3	7	3	10	1	6	5	8	4	8	3	5	4	6	3	5	4	6	2	7	4	8	1	6	3	7	4	9	5	6	4	6	0	6	5	7	4	8	2	5	4	7	5	6	5	7	3
			S	1	2	7	3	3	6	4	10	3	6	2	8	2	9	4	6	2	7	4	5	4	7	5	6	3	8	4	5	5	7	4	9	5	6	3	7	0	6	4	6	3	8	1	5	5	8	5	6	4	7	5
39	F	15-1	I	7	5	5	5	2	7	2	5	5	7	2	7	2	7	3	5	5	7	3	6	3	8	3	8	0	6	1	8	3	5	5	6	4	6	4	6	4	6	4	6	4	9	4	8	4	6	4	10	1	9	3
			S	6	4	5	7	7	3	6	7	6	8	3	7	2	7	3	5	2	7	6	6	4	5	3	8	2	5	9	4	1	2	8	6	4	6	3	8	5	9	3	5	4	10	4	5	4	5	6	0	4	5	1
40	F	14-11	I	6	2	8	2	2	5	2	10	1	7	1	9	3	9	3	7	3	7	3	7	3	7	3	7	0	8	4	8	4	5	4	8	4	6	4	6	4	6	4	6	4	6	5	5	5	5	5	6	5
			S	6	2	7	4	3	1	5	8	5	7	1	8	2	7	5	8	3	6	4	4	3	6	2	9	0	9	6	5	2	3	5	7	3	8	7	6	4	10	4	6	4	6	4	6	3	5	4	5	5	7	5
41	F	14-4	I	10	4	6	3	3	5	3	9	6	4	2	8	4	6	0	5	4	7	2	5	3	6	1	7	1	6	5	6	4	5	3	7	4	8	2	8	5	9	5	7	5	8	4	6	3	7	5	6	4	7	2
			S	5	7	7	1	3	4	1	10	2	3	2	6	4	8	2	9	3	8	2	7	3	7	8	8	0	6	5	6	3	5	6	7	3	6	4	6	4	7	4	5	5	6	5	6	5	9	4	5	4	5	4
42	F	15-8	I	6	3	7	1	4	9	2	5	5	8	1	10	3	7	4	6	5	5	2	8	5	5	3	8	2	6	5	6	4	6	0	6	4	7	5	6	3	7	4	8	3	7	2	6	4	9	4	5	3	7	4
			S	3	2	6	4	4	0	2	4	5	9	2	7	6	5	5	3	4	5	5	1	6	5	4	7	3	6	6	3	2	3	5	8	4	5	7	7	3	6	10	7	4	8	6	9	4	7	5	8	6	8	1
43	M	15-5	I	10	4	3	5	3	9	1	7	5	6	3	8	3	5	3	6	2	8	3	8	4	7	4	5	4	7	5	7	5	9	5	7	0	7	1	4	2	6	4	6	4	6	2	6	2	8	4	6	5	6	5
			S	7	2	6	4	2	10	0	6	3	8	5	7	5	7	4	8	8	6	5	4	4	5	2	8	1	7	1	4	5	4	6	7	3	3	5	5	6	6	4	6	5	9	7	3	3	3	2	9	6	4	5
44	M	15-1	I	8	5	6	5	5	10	5	6	4	5	0	8	4	7	1	8	4	8	1	9	4	7	7	5	2	7	2	6	2	7	4	6	2	7	3	6	3	6	3	6	3	5	3	9	3	5	4	5	4	6	4
			S	5	10	6	6	9	9	8	8	0	8	1	8	1	7	2	7	5	5	2	7	4	7	5	6	2	6	5	5	4	5	6	5	4	7	5	7	2	4	3	4	3	6	3	4	3	3	4	4	6	3	6	3
45	M	14-8	I	10	4	7	5	4	5	4	4	4	5	2	6	5	6	3	6	5	6	4	9	3	6	5	6	4	6	4	7	3	7	3	5	1	8	1	8	5	6	2	9	2	8	2	8	3	7	5	7	3	7	0
			S	7	4	8	9	6	9	8	8	1	8	1	7	2	5	6	7	2	2	5	2	3	0	7	6	3	3	7	5	5	10	5	5	6	3	5	5	3	3	4	4	4	7	6	4	4	5	4	6	6	6	4
46	M	14-10	I	10	4	9	2	2	9	5	6	3	8	4	8	3	8	3	8	3	5	4	7	4	7	0	7	1	7	3	7	3	7	2	6	4	6	4	6	4	6	1	6	4	6	5	6	5	5	2	5	5	5	5
			S	7	7	8	9	5	2	0	3	6	6	6	7	3	8	8	7	2	6	3	1	2	3	10	5	1	6	9	5	4	3	4	5	4	7	4	6	4	5	5	7	6	4	5	3	4	4	5	5	6	8	2
47	M	16-1	I	10	3	8	1	2	9	2	7	2	8	1	8	4	9	2	8	3	7	3	7	3	7	3	7	3	7	0	6	4	6	6	6	4	6	4	6	6	5	4	5	5	5	5	6	5	5	4	5	4	4	5
			S	7	8	9	2	2	7	3	7	1	7	2	9	4	7	0	8	2	8	4	7	4	1	6	8	3	6	4	6	3	10	4	6	3	3	5	5	5	5	4	5	5	5	5	5	6	6	6	3	6	4	5	4
48	M	12-9	I	8	2	9	5	5	7	0	6	2	8	5	7	5	8	1	7	2	8	5	7	2	7	3	7	1	10	3	5	3	6	3	6	4	5	3	6	3	6	4	6	4	5	5	6	4	6	4	4	4	9	4
			S	5	4	7	4	3	6	0	6	2	7	2	6	3	8	2	8	3	4	5	6	3	8	4	7	2	10	4	7	5	8	1	7	3	6	3	7	5	6	4	6	5	4	5	6	5	9	5	4	5	9	1
49	M	14-9	I	10	0	6	1	2	6	2	1	2	7	2	9	3	8	3	8	3	8	3	9	3	7	4	7	4	6	4	6	4	7	5	4	4	7	4	6	4	6	4	6	5	6	5	6	5	7	5	5	5	5	5
			S	5	0	7	2	1	7	5	1	2	6	2	9	2	6	9	5	4	4	6	5	6	6	6	7	3	7	3	3	3	3	5	4	4	8	4	6	4	8	4	8	3	8	10	6	5	5	5	7	5	7	4
50	M	16-0	I	9	1	6	1	3	6	5	6	4	7	5	7	2	7	3	4	3	5	2	9	3	5	3	7	2	7	0	8	4	10	4	6	4	8	4	6	3	6	4	6	4	5	5	8	5	6	5	8	5	7	2
			S	5	2	4	5	7	6	4	5	6	7	2	5	2	6	3	6	5	8	3	9	5	7	2	4	1	4	10	0	1	9	6	5	3	6	5	7	4	6	3	3	7	5	8	8	7	4	4	8	6	3	4
51	M	14-3	I	8	4	9	1	1	9	5	8	5	8	2	8	2	7	4	10	2	7	3	5	3	7	3	7	3	7	3	6	3	6	5	6	4	6	4	6	5	6	4	5	5	6	0	4	4	5	4	7	5	6	2
			S	8	1	9	2	3	7	5	6	2	8	1	8	2	6	6	10	4	6	3	7	6	5	5	3	5	4	7	7	7	3	8	5	6	4	6	4	4	0	5	4	5	2	9	4	4	3
52	M	13-5	I	9	5	9	5	4	8	4	10	1	7	5	8	3	7	3	7	2	5	4	7	4	4	4	8	4	5	5	8	4	5	3	6	5	6	3	6	2	6	5	6	1	6	0	6	3	6	2	7	2	7	3
			S	7	3	7	4	1	6	2	6	4	6	3	6	5	6	5	10	3	8	5	4	4	5	5	7	2	8	4	9	8	4	2	5	6	5	3	6	0	6	1	7	2	7	4	5	3	8	4	9	5	7	3

TABLE XXVI (continued)

Subject Number	Sex	Age	SORT*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
53	M	16-5	I	10	1	9	3	3	9	5	8	3	8	3	7	3	7	2
			S	5	6	2	4	7	4	10	6	4	6	3	6	6	7	7
54	M	14-4	I	6	5	7	4	4	8	0	7	3	8	2	10	2	7	3
			S	5	3	7	3	2	6	6	8	2	7	1	8	1	8	3
55	M	15-6	I	10	3	8	4	4	8	3	8	2	8	2	7	3	7	2
			S	7	3	9	5	5	6	3	8	1	4	2	7	5	8	2
56	M	15-10	I	6	0	6	1	5	6	3	6	2	6	4	6	3	6	3
			S	6	4	6	3	3	6	1	4	3	9	2	6	4	6	3
57	M	16-11	I	6	5	5	5	4	7	2	4	2	3	1	7	2	7	5
			S	5	2	4	1	1	8	5	7	2	9	3	5	2	6	6
58	M	15-5	I	9	0	9	2	1	8	1	10	2	8	2	8	8	7	2
			S	6	2	5	3	2	8	5	10	5	8	2	8	2	7	7
59	M	16-10	I	10	2	9	4	9	8	4	8	2	7	4	7	4	7	7
			S	8	7	6	3	3	7	9	6	2	5	3	5	4	7	4
60	M	15-7	I	10	0	9	4	9	8	4	8	3	7	4	8	4	7	7
			S	5	5	5	7	1	5	4	3	4	8	2	8	9	8	6
61	M	17-7	I	9	5	7	1	2	9	2	6	3	5	1	6	2	8	6
			S	6	3	2	6	3	10	7	8	4	9	4	5	2	4	4
62	M	17-1	I	5	8	5	3	6	9	9	6	4	8	6	5	4	4	8
			S	5	4	4	6	4	6	7	7	3	5	4	9	1	8	5
63	M	16-7	I	10	6	7	4	4	9	4	5	1	7	0	9	2	5	5
			S	6	6	5	3	4	10	2	7	3	7	0	7	3	6	5
64	M	16-10	I	10	0	6	4	4	5	4	8	5	5	5	6	4	6	4
			S	6	2	4	4	3	2	4	8	3	6	2	7	2	10	6
65	M	17-7	I	6	2	7	3	6	3	8	4	3	8	7	7	4	4	4
			S	3	8	5	3	3	8	9	6	7	7	4	7	3	4	6
66	M	16-9	I	9	0	10	3	1	9	8	8	2	8	4	8	2	7	3
			S	6	4	7	3	4	9	4	5	3	6	1	8	1	10	5
67	M	15-2	I	5	3	5	4	3	7	4	4	8	6	5	6	3	7	5
			S	5	1	8	4	2	8	8	7	3	5	4	5	2	6	4
68	M	15-1	I	8	1	6	2	2	7	1	9	4	6	2	7	3	7	7
			S	4	5	6	3	1	7	4	7	3	7	5	8	4	7	5
69	M	16-4	I	8	3	10	2	4	5	2	5	3	5	3	8	5	4	4
			S	6	8	9	4	2	5	7	7	7	6	2	4	1	8	3
70	M	15-8	I	7	4	9	1	2	9	3	10	5	5	3	8	3	5	5
			S	6	4	6	2	3	7	4	9	7	5	3	5	3	5	6
71	M	16-1	I	8	2	9	2	5	8	2	9	3	6	3	7	1	8	2
			S	9	6	2	4	5	6	6	4	7	3	3	7	1	7	8

Subject Number	SORT*	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
53	I	7	2	7	2	8	2	6	4	4	4	7	4	6	4	7	6	6	4	6	4	4	1
	S	7	3	8	3	4	6	6	5	5	1	2	9	8	3	4	5	7	2	8	2	5	3
54	I	6	2	7	6	7	4	5	6	8	2	5	3	6	3	7	4	4	3	6	4	5	6
	S	9	5	6	5	5	4	6	4	2	0	6	4	3	5	10	6	6	2	7	5	7	5
55	I	6	2	6	1	9	5	3	3	7	1	9	3	7	5	7	5	6	0	5	4	6	4
	S	10	5	6	4	5	3	6	5	7	1	6	5	6	4	8	2	8	2	7	3	9	0
56	I	2	4	5	2	6	2	7	3	7	3	7	4	7	4	7	5	10	3	8	4	8	4
	S	6	1	7	5	7	5	8	2	7	3	4	2	3	5	4	0	6	8	9	8	10	4
57	I	8	3	7	6	9	4	6	5	7	1	4	4	8	6	10	3	3	3	4	6	6	3
	S	10	6	8	2	5	4	9	3	4	7	5	3	5	8	8	7	7	6	7	3	7	4
58	I	7	3	7	3	7	7	7	3	6	3	6	3	6	3	6	4	6	4	6	4	6	4
	S	8	4	4	1	5	7	4	1	7	0	9	3	3	3	5	7	7	3	9	3	6	5
59	I	5	4	1	2	6	6	0	3	7	3	6	4	6	5	6	4	6	1	6	4	7	3
	S	5	2	8	3	7	7	8	3	7	2	5	5	10	4	4	6	8	4	9	2	6	4
60	I	5	3	1	2	6	6	1	2	7	3	6	4	6	5	6	4	5	3	5	4	7	2
	S	9	2	8	2	2	7	3	5	6	3	6	7	6	4	7	7	5	3	4	4	7	6
61	I	7	3	8	2	4	5	3	3	7	3	7	0	7	3	10	8	7	4	4	4	4	4
	S	6	5	3	4	5	7	5	4	8	1	5	5	7	2	8	6	6	7	9	3	7	3
62	I	6	7	5	5	7	6	3	0	4	1	6	2	7	2	3	7	4	7	5	3	5	2
	S	5	1	8	5	5	2	4	3	2	2	5	10	6	2	5	4	6	5	7	3	8	3
63	I	5	3	5	3	7	5	4	5	7	2	8	1	6	3	2	5	6	4	7	3	6	4
	S	6	4	4	3	6	5	6	5	8	2	7	5	8	2	5	5	6	4	7	4	6	3
64	I	7	5	6	2	8	4	5	3	6	1	7	4	9	3	6	5	6	3	7	3	5	3
	S	9	3	6	1	7	5	4	1	6	0	7	5	8	3	5	4	5	7	5	5	8	7
65	I	10	4	6	1	4	5	5	2	5	4	6	5	5	0	5	7	5	6	3	6	7	3
	S	9	6	5	4	6	8	5	7	4	1	5	3	7	6	5	6	8	7	6	2	4	1
66	I	7	2	7	3	7	3	2	3	7	1	7	3	6	4	6	6	6	5	5	4	5	4
	S	6	6	7	6	7	4	7	3	5	0	8	2	4	4	8	7	4	2	8	2	6	2
67	I	6	4	9	4	8	3	7	4	6	1	7	5	7	4	10	3	5	6	6	6	5	2
	S	9	3	7	3	7	5	4	2	5	1	6	3	4	3	6	4	6	6	7	7	6	2
68	I	6	2	8	3	8	7	3	3	7	3	8	3	9	4	6	4	5	5	5	5	6	5
	S	8	3	8	2	6	3	5	2	6	0	9	5	1	3	6	5	6	6	5	6	10	4
69	I	6	1	6	3	7	0	7	4	7	6	6	4	5	3	6	4	7	4	5	5	9	6
	S	6	2	6	6	1	2	6	4	5	3	7	4	5	4	7	5	9	5	5	4	5	0
70	I	5	1	6	0	5	4	7	5	6	3	7	4	7	2	7	4	8	5	6	3	7	2
	S	4	3	7	2	5	5	5	5	5	2	4	4	6	0	7	4	6	6	6	1	8	4
71	I	7	3	7	1	7	3	8	4	6	3	3	4	6	4	10	6	7	6	6	5	4	4
	S	6	3	7	5	7	4	3	3	8	3	1	5	8	7	4	2	9	6	6	8	5	5

Subject Number	SORT*	38	39	40	41	42	43	44	45	46	47	48	49	50	51
53	I	6	5	6	5	5	5	8	5	5	0	6	5	5	5
	S	7	3	4	1	8	6	5	4	5	0	9	5	5	4
54	I	9	5	5	4	5	4	6	5	5	1	8	1	9	3
	S	7	2	4	4	8	4	6	5	4	3	5	4	9	3
55	I	5	4	6	4	6	5	6	5	7	4	6	4	5	5
	S	5	3	5	4	6	6	6	4	7	4	3	4	7	4
56	I	8	4	8	4	9	1	5	5	9	5	5	5	7	5
	S	7	5	4	4	7	5	6	5	7	2	8	5	5	5
57	I	4	5	6	2	4	8	9	7	5	5	6	5	8	0
	S	5	4	6	3	6	4	5	4	5	3	4	6	6	0
58	I	6	4	5	4	5	4	5	4	5	5	5	5	5	5
	S	6	4	5	5	6	6	4	4	6	4	5	6	6	4
59	I	8	2	5	5	3	5	5	3	5	3	8	5	6	5
	S	6	0	4	1	6	5	6	5	5	5	6	1	3	4
60	I	7	3	5	6	2	5	5	4	5	3	8	5	6	6
	S	6	4	3	3	5	6	0	1	5	4	6	10	5	4
61	I	4	4	5	5	5	6	6	5	5	5	6	6	8	6
	S	8	1	3	6	5	7	4	2	6	5	6	4	5	0
62	I	5	1	7	6	10	4	8	6	5	3	4	3	4	2
	S	6	6	0	3	9	6	7	6	7	4	8	3	7	4
63	I	6	2	8	5	6	6	8	4	6	4	7	3	8	3
	S	8	2	5	5	9	4	3	1	9	1	8	4	7	4
64	I	7	1	9	3	6	5	7	4	8	1	8	2	7	2
	S	8	5	5	4	9	6	5	6	4	3	7	4	6	3
65	I	8	1	8	9	9	5	6	4	6	2	2	7	5	3
	S	6	2	2	4	3	4	10	5	5	0	2	4	5	5
66	I	6	4	5	4	6	4	5	5	5	4	6	5	6	5
	S	7	3	3	3	5	5	5	5	6	4	9	5	6	5
67	I	7	2	5	4	6	2	8	8	5	3	2	1	9	0
	S	7	5	6	4	8	3	5	9	5	0	10	5	6	4
68	I	6	4	5	4	6	0	10	4	6	4	5	5	5	4
	S	7	2	8	4	9	5	4	3	5	4	7	4	6	2
69	I	6	4	8	3	8	5	7	2	7	5	6	1	9	2
	S	5	5	6	6	7	3	4	3	8	4	8	3	10	3
70	I	6	2	6	4	6	6	4	3	8	5	5	4	8	4
	S	7	1	6	7	8	8	10	2	8	4	9	3	5	3
71	I	5	0	5	4	7	4	6	4	6	5	5	5	5	5
	S	6	2	5	5	5	10	4	4	6	4	0	4	5	2

TABLE XXVI (continued)

Subject Number	Sex	Age	SORT*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
72	M	16-4	I	6	7	7	1	4	7	4	6	4	6	5	10	5	6	4	5	5	5	5	5	3	3	3	7	3	6	2	9	5	6	3	6	4	8	4	8	3	7	0	5	4	6	2	9	4	7	2	8	2	8	1
			S	4	3	3	5	0	8	1	8	4	6	2	3	5	9	2	7	3	6	1	9	6	5	4	7	3	7	4	8	4	3	6	8	4	5	6	6	2	6	6	5	5	7	7	7	5	2	4	10	4	5	5
73	M	16-5	I	5	5	5	1	5	5	3	5	1	7	7	8	0	6	2	9	2	8	2	2	3	7	3	7	3	9	3	3	4	8	4	4	4	10	4	8	7	7	4	6	6	6	6	6	5	6	5	6	4	5	4
			S	5	3	5	3	3	5	6	6	2	7	7	9	6	7	3	10	5	9	4	5	8	6	1	7	4	8	1	4	4	6	4	5	4	7	3	6	5	7	4	3	4	8	6	5	2	5	2	8	2	6	0
74	M	16-4	I	7	8	10	4	8	9	4	8	4	7	4	8	4	4	7	7	3	6	3	5	5	4	2	6	2	7	5	6	2	5	5	3	3	6	2	6	5	6	5	5	3	6	3	5	1	6	1	9	4	7	0
			S	5	7	4	3	5	6	5	6	4	6	3	6	1	3	0	9	5	9	2	6	7	4	6	5	2	4	2	5	2	5	4	7	3	6	4	6	4	7	4	7	7	10	8	8	3	3	5	8	5	8	1
75	M	16-6	I	10	5	7	1	1	5	5	5	8	7	5	9	2	7	9	8	2	8	0	8	5	7	5	5	2	2	5	7	7	6	3	3	6	6	6	6	3	3	3	3	4	6	4	4	4	4	4	4	4	6	6
			S	5	5	7	5	1	5	5	8	3	7	5	8	3	9	5	8	5	9	0	8	1	7	2	7	2	7	3	5	10	7	2	6	6	6	3	6	2	6	3	3	4	6	4	6	4	6	4	4	4	4	4
76	M	17-2	I	6	5	6	4	3	7	4	5	4	6	4	5	5	9	4	5	4	5	2	6	7	3	4	7	3	6	5	6	4	6	3	9	5	6	7	7	3	7	3	8	2	2	2	8	1	8	1	10	0	8	5
			S	5	5	7	5	5	6	4	5	2	6	4	7	6	6	4	7	4	4	2	8	3	7	4	5	3	6	3	8	3	7	2	6	5	7	3	6	3	5	0	6	4	10	4	8	1	8	1	9	2	9	5
77	M	15-6	I	10	6	6	4	3	7	6	8	3	6	4	7	4	9	3	5	3	5	2	4	5	8	1	6	1	7	4	8	0	7	5	5	4	5	6	5	4	8	4	6	5	6	3	9	2	7	2	5	3	7	2
			S	6	1	8	4	5	9	2	5	4	9	6	8	5	5	3	10	2	6	5	7	4	6	3	6	1	7	4	6	5	5	2	5	4	7	3	6	4	6	3	4	3	8	4	7	3	7	2	7	5	8	0
78	M	15-8	I	7	8	8	4	3	9	2	5	7	9	1	5	4	5	7	7	4	3	2	8	6	4	4	6	0	6	3	8	6	4	3	5	6	5	2	6	5	5	3	7	6	5	4	10	4	6	2	5	3	7	1
			S	4	6	5	4	8	9	2	8	3	2	2	5	7	7	6	9	3	3	3	3	8	8	4	7	0	6	4	6	4	5	4	6	3	7	7	5	2	6	1	4	5	6	6	4	1	5	5	10	7	5	5
79	M	15-9	I	5	9	8	7	6	6	4	6	5	5	5	7	0	9	5	6	2	10	2	6	2	5	3	3	3	5	5	6	3	7	3	8	4	4	3	6	1	2	4	8	7	8	7	5	4	7	4	4	4	6	1
			S	5	2	5	2	4	10	1	7	3	4	3	7	0	8	2	7	3	6	3	5	3	5	3	6	1	7	5	6	4	6	5	9	4	9	4	8	4	6	4	6	6	8	7	5	5	8	2	6	5	7	4
80	M	15-8	I	10	1	9	3	4	8	0	6	5	7	4	6	5	5	1	5	4	6	3	6	2	8	4	4	2	7	2	9	3	6	5	7	2	6	3	5	6	5	3	8	5	6	4	7	3	7	6	8	4	7	4
			S	4	5	5	4	7	7	2	5	5	9	4	8	6	6	5	8	2	8	2	1	3	5	4	7	0	6	8	4	2	4	6	10	7	9	3	6	3	5	3	1	6	7	4	5	4	6	3	6	7	5	3
81	M	16-9	I	10	9	5	3	2	6	2	5	5	6	4	7	4	7	5	7	1	4	3	8	8	2	2	9	4	5	4	5	4	5	1	6	3	6	3	6	0	6	6	6	4	8	5	7	3	7	4	7	3	8	5
			S	9	0	6	1	6	10	5	6	5	3	2	8	3	5	2	2	2	5	6	5	8	3	3	7	3	6	3	5	4	4	8	4	4	7	4	7	4	7	5	4	6	9	7	5	4	6	1	7	8	6	5
82	M	17-9	I	6	0	10	1	1	6	3	8	3	2	2	9	2	6	2	8	4	9	3	6	3	8	3	5	3	8	4	7	4	7	4	5	4	5	4	6	4	7	4	7	5	7	5	7	5	6	5	6	5	5	5
			S	6	1	6	5	7	6	7	9	6	2	5	8	3	6	2	10	2	5	2	5	3	7	6	6	0	5	4	4	1	5	3	5	5	7	3	7	3	7	3	4	8	4	4	3	8	4	4	5	5	9	5	8	4
83	M	17-6	I	10	4	6	3	8	6	9	4	5	4	3	4	3	6	2	5	3	2	2	7	6	7	9	6	5	4	5	5	2	6	4	5	8	7	6	1	0	7	3	6	4	4	3	8	7	5	1	8	5	5	7
			S	5	5	3	2	7	8	9	5	6	9	5	4	3	8	5	10	0	3	3	5	6	8	4	5	6	5	6	4	4	7	6	8	1	6	6	7	4	6	3	4	7	7	6	4	2	4	4	5	1	4	7	4
84	M	15-7	I	7	0	8	1	5	8	1	8	2	5	2	8	2	7	7	7	4	2	3	7	3	7	3	9	3	6	4	9	4	6	3	6	6	10	4	5	4	6	4	6	4	6	4	5	5	5	8	6	3	5	5
			S	5	3	6	2	1	7	0	6	5	6	5	7	3	6	6	7	10	4	4	6	4	4	3	5	3	6	1	2	4	5	4	7	7	8	2	7	4	2	3	3	5	6	4	5	5	8	8	5	9	9	5
85	M	15-7	I	10	1	7	5	3	9	4	6	5	5	4	5	3	6	4	5	3	6	5	8	4	6	3	7	0	5	3	8	3	7	2	7	2	6	4	6	2	6	1	8	4	7	6	4	8	5	7	5	9	9	2
			S	6	5	6	4	4	10	5	9	4	3	2	6	2	8	3	7	4	4	1	3	4	7	4	7	0	6	6	5	5	7	3	7	5	8	3	7	5	6	2	5	5	6	5	6	2	9	1	8	4	8	3
86	M	15-10	I	10	2	7	2	4	8	3	6	6	5	1	5	3	5	9	7	5	5	2	7	4	6	3	8	0	6	2	8	6	5	3	4	7	9	1	5	4	7	4	8	6	4	3	4	5	7	3	4	5	6	4
			S	6	1	4	3	5	6	4	5	5	6	2	5	4	6	6	7	3	2	1	8	6	8	8	7	0	4	5	10	3	5	6	5	3	5	3	7	2	9	2	5	6	8	7	4	3	7	4	9	4	7	4
87	M	17-11	I	10	0	9	1	1	9	2	8	2	8	2	8	2	8	7	7	3	7	7	7	3	6	6	7	3	6	3	6	3	6	3	6	6	6	4	5	4	5	4	5	5	4	4	5	4	5	4	5	5	5	4
			S	0	1	5	7	9	2	9	8	2	8	8	8	2	7	7	7	7	2	3	1	7	3	3	10	3	3	6	6	4	6	6	6	6	6	6	5	4	5	4	5	4	4	5	4	5	5	5	5	3
88	M	16-9	I	9	4	5	2	2	6	1	7	3	7	4	5	3	5	8	6	5	10	3	7	4	9	4	5	0	6	2	7	2	8	4	7	1	6	5	5	5	6	3	6	4	8	3	6	4	8	3	6	5	7	4
			S	9	3	6	1	2	7	7	4	4	8	4	3	2	7	2	7	3	1	2	8	3	4	4	3	4	7	9	4	4	6	6	6	0	7	3	6	6	8	8	6	6	5	10	5	5	5	5	5	5	5	5
89	M	15-8	I	8	5	9	3	1	9	3	8	2	10	2	8	2	8	3	7	3	5	5	7	3	7	0	7	5	5	4	6	4	6	4	6	4	6	4	6	4	6	4	6	4	6	4	6	5	7	3	5	2	5	1
			S	5	2	5	5	3	5	1	8	6	10	5	8	0	6	5	7	6	4	6	7	6	7	4	3	3	4	7	9	5	7	2	8	8	6	5	4	9	6	2	2	3	4	1	4	3	5	3	7	6	4	4
90	M	15-4	I	0	1	10	1	5	9	2	8	2	8	3	9	2	8	2	8	3	7	3	3	7	3	4	7	3	7	4	7	4	4	4	6	7	3	7	5	6	5	6	4	6	6	6	5	5	5	9	5	10	5	
			S	0	1	5	1	6	7	8	6	2	6	2	6	3	7	6	9	2	2	3	3	6	4	3	8	3	5	4	7	4	4	6	7	3	7	5	6	5	7	4	8	4	8	4	4	5	5	5	9	5	10	5

TABLE XXVI (Continued)

Subject Number	Sex	Age	SORT*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
91	M	18-7	I	6	2	8	3	3	9	5	5	5	6	3	10	2	6	4	5	3	5	4	8	0	8	1	7	4	8	2	6	4	6	1	5	2	7	3	7	4	6	6	6	4	7	5	7	5	7	3	4	4	9	5
			S	3	5	6	1	1	6	7	2	2	8	3	10	5	5	4	6	5	8	2	5	7	6	2	6	5	5	3	7	5	9	4	4	6	4	4	9	4	7	0	8	3	8	3	6	6	5	3	7	4	7	4
92	M	15-3	I	7	6	6	2	6	7	4	9	4	5	3	8	4	7	4	5	4	8	3	5	3	5	2	6	2	6	0	6	4	5	1	9	4	10	7	5	3	6	2	5	4	8	3	5	7	7	3	6	1	8	5
			S	5	8	5	1	8	7	5	7	4	4	2	6	3	5	6	6	4	6	1	6	4	6	3	7	0	5	3	4	5	5	4	9	4	10	8	7	3	5	2	2	4	9	3	6	8	7	5	6	3	7	2
93	M	15-11	I	10	0	4	3	1	7	5	9	7	4	1	6	2	7	2	6	5	6	2	9	7	4	5	4	2	7	3	8	3	8	8	6	3	3	3	4	4	6	4	7	4	6	5	8	5	6	5	6	5	5	5
			S	6	3	5	5	4	7	5	7	4	8	1	7	3	6	2	10	4	6	2	6	5	7	2	8	0	5	5	5	3	6	4	7	3	8	4	5	4	6	1	4	5	9	6	8	3	6	3	9	4	7	2
94	M	15-5	I	7	4	5	5	5	9	2	6	5	8	4	6	4	5	5	5	4	6	3	7	4	7	4	6	3	7	3	6	2	4	0	7	5	5	3	8	3	7	3	6	1	9	1	8	2	8	4	10	6	6	2
			S	3	7	8	6	5	6	3	6	4	9	4	6	4	6	5	10	4	4	7	5	5	5	4	7	3	1	7	5	8	1	3	7	8	8	2	5	3	4	2	2	5	9	6	4	2	6	6	0	5	7	3
95	M	15-5	I	9	2	7	3	4	8	2	6	4	10	3	5	1	8	4	5	3	6	4	8	2	6	4	7	3	7	3	6	8	6	4	6	5	5	1	7	2	5	3	7	0	5	5	9	5	6	4	6	4	7	5
			S	9	1	9	7	4	8	2	10	4	3	0	6	2	8	1	8	2	7	2	7	3	5	3	7	3	7	4	7	5	8	4	6	5	5	6	5	5	6	4	6	4	6	5	4	5	6	3	6	4	5	3
96	M	15-4	I	7	2	6	6	2	6	3	7	4	7	4	9	2	7	5	10	4	7	4	9	0	5	3	8	4	8	5	6	3	6	4	5	3	5	5	7	3	8	2	5	1	5	4	6	4	8	4	6	1	6	3
			S	5	5	7	2	7	5	5	7	3	6	4	10	3	7	4	9	4	8	5	5	4	8	2	8	0	6	3	7	4	5	6	6	6	5	4	9	1	8	1	6	2	6	5	4	3	7	3	3	4	6	2
97	M	16-1	I	7	1	8	2	1	8	3	7	3	9	4	6	0	8	3	6	4	7	5	6	2	10	5	5	4	6	2	6	4	7	2	6	4	6	4	5	5	5	4	6	5	8	3	7	3	9	3	7	4	5	5
			S	6	9	7	7	10	6	8	7	1	2	5	4	9	8	5	7	5	4	0	7	3	5	3	7	5	4	6	6	2	5	8	6	2	6	5	4	3	6	4	5	3	3	3	4	2	5	1	8	4	4	6
98	M	15-9	I	8	2	9	4	1	6	0	7	3	5	2	6	2	6	4	6	5	7	3	6	4	6	3	8	1	5	2	6	4	5	3	5	5	7	3	6	3	8	4	8	5	9	5	7	5	7	4	7	4	10	4
			S	4	5	10	3	8	5	1	7	4	7	5	6	3	8	6	7	4	9	3	5	4	6	3	5	2	8	8	6	3	4	4	7	6	6	5	7	2	6	2	0	5	5	3	4	2	7	1	9	4	6	5
99	M	15-5	I	10	2	7	3	4	8	1	6	4	5	1	7	5	6	2	8	5	5	3	9	2	4	3	7	4	7	3	6	4	7	4	6	2	5	3	6	4	5	4	8	3	6	7	9	5	6	5	8	5	6	0
			S	6	2	6	5	5	6	1	8	5	6	3	9	4	8	5	9	3	2	3	4	6	7	7	4	4	5	7	7	3	5	2	2	4	6	7	8	5	6	4	1	4	10	3	5	5	8	4	3	6	7	0
100	M	15-1	I	10	5	6	4	4	5	0	9	2	6	4	7	4	8	4	8	4	7	3	5	3	5	2	5	1	7	4	6	3	4	2	7	3	6	3	8	1	9	5	6	2	6	5	6	3	6	5	8	7	7	5
			S	5	5	7	6	2	4	0	10	2	5	1	8	2	8	5	9	4	6	3	6	4	5	3	6	3	8	4	4	4	3	1	7	4	5	7	5	5	7	5	9	3	7	6	4	6	6	2	8	7	6	3
101	M	15-7	I	4	0	6	1	4	6	4	8	5	6	3	7	5	6	5	6	5	7	4	6	5	6	4	5	4	5	2	6	3	10	3	8	3	7	3	7	4	7	2	7	3	8	2	8	2	9	5	5	4	9	1
			S	6	5	7	4	4	4	3	9	0	7	3	6	2	8	5	9	3	5	3	5	3	6	6	5	2	7	4	5	3	8	4	10	4	7	4	7	4	8	2	7	1	6	1	5	6	6	5	6	5	8	2
102	M	15-4	I	9	3	8	3	1	8	4	5	5	6	0	6	4	7	4	5	4	4	3	8	7	6	2	7	1	6	2	7	5	5	3	6	7	10	5	6	4	5	3	6	4	5	5	9	3	6	2	8	4	7	2
			S	7	1	8	4	2	10	3	5	3	8	2	8	1	6	2	9	2	7	3	7	5	5	3	8	0	7	9	7	6	5	4	5	3	6	4	6	4	6	3	6	4	6	5	6	4	5	4	4	5	7	5
103	M	16-5	I	8	5	9	3	1	9	1	4	4	6	2	7	3	7	2	6	4	8	3	7	2	7	2	10	0	6	3	7	3	6	3	6	4	6	4	6	4	7	4	8	4	6	5	8	5	5	5	5	5	5	5
			S	5	5	9	3	1	4	0	6	3	5	5	6	6	7	6	8	4	6	4	4	2	7	2	4	2	5	7	8	2	3	5	5	3	7	6	6	3	5	3	1	4	10	7	4	6	8	5	9	7	8	4
104	M	15-6	I	7	4	6	3	5	10	4	7	5	7	5	6	4	6	1	3	4	7	4	8	5	5	4	7	4	6	0	6	1	9	5	6	4	5	3	6	3	6	3	5	2	8	5	7	2	8	3	9	2	8	2
			S	5	5	3	6	6	6	3	7	2	5	5	5	4	7	5	6	3	3	5	7	3	3	4	4	0	8	6	8	2	4	1	7	4	8	2	5	6	6	5	7	2	9	4	8	4	7	1	10	4	9	6

*"I" stands for "Ideal-Sort", and "S" for "Self-Sort".

APPENDIX VI

SUMMARY OF THE THEORY AND APPLICATION OF VAN DER WAERDEN'S TEST FOR THE SIGNIFICANCE OF THE DIFFERENCE BETWEEN TWO MEANS

The following summary of van der Waerden's test for the difference of the means of two samples is essentially that given by E. S. Keeping.[1]

Let there be two sets of observations: $x_1, x_2, \ldots, x_m$, with mean $\bar{x}$: and, $y_1, y_2, \ldots, y_n$, with mean $\bar{y}$. It is desired to test the null hypothesis that $\bar{x} - \bar{y} = 0$, against the alternative hypothesis that $\bar{x} - \bar{y} > 0$. Let the observations be combined and arranged in order of increasing size. Let the combined set be labelled $z_1, z_2, \ldots, z_N$, where $N = m + n$. It is possible to associate with each of the z_k ($k = 1, 2, \ldots, N$) a standardized normal variate ξ_k, defined by,

$$\Phi(\xi_k) = \frac{k}{N+1} \quad , \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(1)$$

whose inverse function is defined by,

$$\Psi\left(\frac{k}{N+1}\right) = \xi_k \quad , \quad \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{\Psi\left(\frac{k}{N+1}\right)} e^{-t^2/2}\, dt = \frac{k}{N+1} \quad , \ldots\ldots\ldots(2).$$

The values of $\Psi\left(\frac{k}{N+1}\right)$ are easily obtained from tables for the Cumulative Normal Distribution.

Let the values of ξ_k corresponding to the x's be denoted by, $\xi_1, \xi_2, \ldots, \xi_m$. If $\sum_{i=1}^{m} \xi_i$ is greater than zero, the x's, as a group, will be larger than the y's. If this sum exceeds a certain critical value, depending on m and n, $\bar{x} - \bar{y}$ will be significant.

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1. E. S. Keeping. The Power of Statistical Tests, WADC Technical Report 54-9, Wright Air Development Center, Air Research and Development Command, United States Air Force, Wright-Patterson Air Force Base, Ohio, 1953.

The critical values are obtained from the formula,

$$\text{Critical Value} = \Psi(1-\alpha)\left\{\frac{mnQ}{N-1}\right\}^{\frac{1}{2}} \quad \text{.....(3)},$$

where,

$$Q = \frac{1}{N}\sum_{k=1}^{N}\left\{\Psi\left(\frac{k}{N+1}\right)\right\}^{2} \quad \text{....(4)},$$

and where α is the probability of rejecting the null hypothesis when it is true, that is, of making an error of the first kind.

The approximation,

$$Q = 1 - \frac{2\ln N}{N} + \frac{\ln \ln N}{N} \quad ,$$

may be used when N is large. (In this formula ln means the natural logarithm.)

If a set of p observations, say, z_{q+1}, z_{q+2}, ... , z_{q+p}, are ties, we associate with each observation of the set of the mean value,

$$\frac{\sum_{i=1}^{p} \xi_{q+i}}{p}$$

instead of the values given by equations (2). These values are used, for the tied set, both in computing $\sum_{i=1}^{m}\xi_i$, and in evaluating Q by equation (4).

The following example illustrates the use of van der Waerden's method in testing the significance of the girls' group dissatisfactions in the areas of "Mind" and "Mental Processes". The observations will consist of the girls' group dissatisfactions associated with "Mind" (the x's), and "Mental Processes" (the y's). Thus, n = 15, m = 12, N = 27, $\bar{x} = 1.00$ and $\bar{y} = .68$

TABLE XXVII COMPUTATION TABLE FOR COMPUTING THE SIGNIFICANCE OF THE DIFFERENCE IN GIRLS' GROUP DISSATISFACTIONS IN THE AREAS OF "MIND" AND "MENTAL PROCESSES" BY VAN DER WAERDEN'S METHOD

Statement No.	k	Group Diss. (z_k)	$\frac{k}{N+1} = k/28$	φ_k	Mean φ's for Tie Groups	i	ξ_i**	$\left\{\Psi\left(\frac{k}{N+1}\right)\right\}^{2}$**
49	1	.024	.036	-1.799				3.236
22	2	.119	.071	-1.468				2.155
42	3	.167	.107	-1.243				1.545
32	4	.286	.143	-1.067				1.138
37	5	.333	.179	-.919				.845
23	6	.404	.214	-.793				.458
36	7	.404	.250	-.674	-.677			.458
43	8	.404	.286	-.565				.458
8	9	.452	.321	-.465				.103
41*	10	.452	.357	-.366	-.321	1	-.321	.103
21*	11	.452	.393	-.272		2	-.321	.103
50*	12	.452	.429	-.179		3	-.321	.103
18	13	.476	.464	-.090				.008
35*	14	.500	.500	.000		4	.000	.000
17*	15	.524	.536	.090		5	.090	.008
46*	16	.571	.571	.179		6	.179	.032
14	17	.666	.607	.272	.319			.102
26*	18	.666	.643	.366		7	.319	.102
12*	19	.881	.679	.465		8	.465	.216
9	20	.905	.714	.565				.319
13	21	1.167	.750	.674				.454
40*	22	1.262	.786	.793		9	.793	.629
3*	23	1.500	.821	.919		10	.919	.845
31*	24	1.738	.857	1.067		11	1.067	1.138
27	25	2.024	.893	1.243				1.545
4	26	2.381	.929	1.468				2.155
7*	27	2.929	.964	1.799		12	1.799	3.236
Totals							4.668	21.494

* x's
** Adjusted for ties.

Table XXVII summarizes the computations involved in testing the significance of the difference of these means by van der Waerden's method. At the 5% level of significance, $\alpha = .05$, $1 - \alpha = .95$, and $\Psi(1 - \alpha) = 1.645$. Thus $Q = \frac{1}{27} \times 21.494 = .796$, and

$$\text{Critical Value} = 1.645 \left\{ \frac{12 \times 15 \times .796}{26} \right\}^{\frac{1}{2}} = 3.860.$$

Since $\sum_{i=1}^{12} \bar{z}_i = 4.668$, the critical value is exceeded and the difference in means is significant at the 5% level.